THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
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# COMPUTERWORLD

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# Vendors skewing DBMS tests

BY CHARLES BABCOCK
CW STAFF

Recent relational data base management system benchmarks have yielded surprisingly dissimilar results for tests purporting to measure the same thing. A closer look reveals that some results have less to do with the software's merits than with how the vendor arranged the test.

How else can one explain why Sybase, Inc. reports 29.3 transaction/sec., Relational Technology, Inc. claims it has crashed the 100 transaction/sec. barrier and Cullinet Software, Inc. — a company not given to understatement — weighs in at a paltry 13.4 transaction/sec.?

As if these disparities were not enough, IBM has further roiled the waters by announcing that DB2 Version 2 can handle between 300 and 438 transaction/sec. in a test that uses a transaction resembling minicomputer supplier benchmarks.

### Eye of the beholder

*Characteristics of "standard" debit/credit benchmarks used by data base vendors often vary*

| | Tandem | Sybase | Relational Technology | Cullinet |
|---|---|---|---|---|
| Independently audited | ✓ | ✓ | ✓ | |
| Transaction type | ET1 | TP1 | TP1 | TP1 |
| Mirror logging | ✓ | | ✓ | |
| Subsecond response time | | ✓ | ✓ | ✓ |

CW CHART

**You had to be there**

In fact, the transactions involved — TP1, or a sequence of instructions that imitates activity at a bank branch — were highly similar from test to test. But the circumstances under which the transactions ran varied widely. The differences were significant enough that users will have a tough time drawing any conclusions from the tests.

Relational, for example, ran its benchmark on Sequent Computer Systems, Inc. processors, even though the largest slice of its customer base uses the Digital Equipment Corp. VAX.

When asked why Sequent was selected, Aaron Zornes, director

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# Amdahl tops IBM MIPS

BY J. A. SAVAGE
CW STAFF

SUNNYVALE, Calif. — A supremely confident Amdahl Corp. said last week that it will ship its next-generation mainframe, a dual processor said to be capable of more than 50 million instructions per second, next month — even though there were no beta-test sites and no orders as of the day of the announcement.

A quad-processor machine capable of more than 100 MIPS will be available by the end of the year, the company claimed. The Amdahl 5990 Model 1400 will start at $13 million, and the smaller Amdahl 5990 Model 700 will be priced at about $7 million. Both are said to run at 10 nsec per cycle. The company also announced a multiprocessor version of its earlier 5890 Model 390E.

This is the first time an IBM plug-compatible vendor has announced a new generation of mainframes before IBM. "IBM made us more bullish when it announced ESA," said Eugene White, Amdahl's vice-chairman. "It allows you to do more things because you know what the architecture will look like in five years. The specs are close to the

*Continued on page 8*

# Hype headaches for MIS

BY DOUGLAS BARNEY
CW STAFF

A recent television commercial for Wang Laboratories, Inc. described an unnamed MIS manager with a problem. He had an IBM mainframe, a DEC workstation and an IBM PC, none of which were communicating effectively. The solution was simple enough: Just add another computer — in this case, a Wang VS — and some communications components to tie it all together.

Just after the commercial ran, George Perera began to get inquiries from people at Ryder Truck Rental, Inc., where he serves as director of operations.

"Everybody came around and said, 'You got rid of this Wang system, and look what it could have done for me,' " Perera recalled. "But what I had was a Wang WP 30 — a word processor from the Year 2."

Overly simplistic advertising, vendor hype, simple word

*Continued on page 15*

### Seven famous unshipped products:

**Silverlake:** IBM's System/36 and 38 replacement.

**Micro Channel-compatible systems:** Neither Tandy Corp.'s nor Dell Computer Corp.'s has shipped. Tandy's will cost more than the street price of an IBM PS/2.

**ISDN:** Do everything from your phone. It's being tested, but practicality and cost are unknown.

**OSI/Decnet Phase V:** Announced for 1990.

**Presentation Manager:** An interface to make PS/2s compatible for the rest of us.

**1-2-3 Release 3:** Lotus Development Corp. devotees are still waiting.

# Skepticism over PS/2 clone label

*Compatibility claims, cost benefit in doubt*

BY JULIE PITTA
and ALAN J. RYAN
CW STAFF

Corporate America is not yet ready to take third-party vendor claims of compatibility with the Micro Channel architecture of IBM's Personal System/2 at face value. And they are not about to invest in clones until competing vendors can offer the same cost savings that built the Personal Computer clone business in the first place.

"If there isn't a price advantage to taking a risk, why do it?" asked Cheryl Currid, manager of departmental computing services at Coca-Cola Foods in Houston.

So far, Tandy Corp. and Dell Computer Corp. are the only two vendors to have announced PS/2 compatibles, but others are expected to follow in short order.

Dell has yet to disclose how it will price its systems, while Tandy's machine will be priced from $5,000 to $7,000 — significantly higher than the available retail price of IBM's PS/2 Model 80. Neither vendor is likely to deliver before IBM cuts its official list prices (see story page 6).

**Intrigued, but cautious**

Currid and other information systems managers interviewed last week admitted they are intrigued by the possibility of a new clone industry undercutting IBM's PS/2 line. But they also made it clear that they are not going to buy anything until they are absolutely certain such compatibility really does exist.

"I would want it to be 100% compatible," said Samuel Leming, manager of data processing in the central marketing area of The Kroger Co. in Indianapolis. "We are faced with too much hardware to say, 'You can't run everything on that piece of equipment.' "

Proving compatibility is a major concern, and one that cannot be easily resolved.

"If somebody said, 'Our [clone] is 100% compatible,' I

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NEWSPAPER

SECOND CLASS

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CHERYL CURRID
COCA-COLA FOODS

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EDITOR'S NOTE

In the "IBM-compatible acquisitions" chart in the Special Report this week, the bars labeled Intel 8088-, 80286- and 80386-based PCs should be labeled IBM Personal Computer XT and compatibles, PC AT and compatibles and PS/2.




# Fighting city hall

*Computer cooling system aggravates drought*

BY J. A. SAVAGE
CW STAFF

SAN FRANCISCO — Plumbing installed a quarter of a century ago to cool San Francisco's first computer has been cited as the biggest squanderer of city water, which is currently being rationed because of California's drought.

Water used by the city's original IBM 1401 Model 120 cooling system and now used for a two-processor 3084-Q — a total of about 98,000 gallons of drinking water per day — is dumped into the sewer after one pass.

The computer, located in City Hall, is used to process payroll, tax assessments, welfare rolls and medical information, according to Henry Nanjo, director of information services for the city. Nanjo said his office called attention to the water wasting this winter "because we were expecting the drought."

But until the drought became officially recognized — with an initial 10% water-usage cut required by May 1 — little was done.

### Nickels and domes

A major obstacle to recycling the water that cools the 7,500-square-foot computer room is the French Renaissance architecture of City Hall. To recycle the water, its temperature must be lowered after the first pass, and the usual method is to run it through a cooling tower. Such towers, however, are big, boxy projections usually set on top of a building. There is little space for a cooling tower atop the ornate dome of City Hall.

Another reason for putting off recycling efforts is that City Hall does not have to pay for city water. The first time water waste at the computer room came up was during the drought from 1976 to 1977. Then, the city tapped into an underground stream, according to city engineer Dennis Huey. Unfortunately, the stream water was full of minerals that clogged and corroded pipes. The city soon switched back to its drinking water system fed from Hetch Hetchy reservoir in Yosemite National Park.

Currently, the city is studying the most economical place to locate a cooling tower with minimal visual impact. The cost of recycling computer room water is estimated at $200,000 — an amount difficult to find this year in a city with a nearly $200 million deficit.

"It's not so much a bottom-line issue as a conservation and image problem," the mayor's press secretary said. He would not speculate on the odds of such a project being funded.

Another alternative is to cut back the flow to the computer room by 10%, but that would mean eliminating processing for some city departments. If the recycling project is funded, Huey said, it could be finished this summer, before the worst effects of the drought are felt.

# IBM joins networking forum

BY NELL MARGOLIS
CW STAFF

CHELMSFORD, Mass. — IBM last week added its name to the roster of the Network Computing Forum, a year-old gathering of manufacturers, users and academicians who have put their heads together to air ideas for computing across multivendor networks.

Spearheaded by Apollo Computer, Inc., the forum — affiliated with the Corporation for Open Systems (COS) — was established in March 1987 with 31 charter members. Membership now stands at approximately 110.

"IBM's joining the forum is clearly an important event; their presence will lend credibility to the forum's efforts," said David Nelson, the forum's cofounder and chief technical officer.

When the forum holds its third semiannual meeting later this month at the University of Michigan, Nelson said, the only "major company in the industry that won't be on the membership list is DEC." However, he added, "while DEC is still absent from formal membership, they do attend some of the meetings."

Nelson was quick to point out that IBM's forum membership "clearly does not mean an endorsement of [Apollo's] Network Computing System, which motivated the creation of the forum."

While the forum is not a standards-making organization, Nelson explained, the exchange of ideas that it fosters will speed the evolution of standard technical approaches to the use and administration of networks. For instance, Nelson said, "We have had a healthy exchange with regard to remote procedure call protocols, and have agreed to support the ISO [International Standards Organization] standard efforts in this area."




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# Cray replaces X-MP line

*New series brings extended architecture to users*

BY STANLEY GIBSON
CW STAFF

MINNEAPOLIS — Cray Research, Inc. replaced its best-selling X-MP product line last week with an extended-architecture version called the Cray X-MP EA.

The new line offers up to four times the memory of Cray's X-MP systems and implements the 32-bit architecture announced with the Cray Y-MP, which was introduced in February. The X-MP features a 24-bit architecture.

The X-MP EA series, priced from $2.5 million to $14 million, can operate in either the 24-bit mode of the X-MP or the 32-bit mode of the Y-MP, according to Cray. The systems contain one to four CPUs.

Y-MP models, priced at about $20 million, use eight processors. In addition, they operate at a 6-nsec clock speed.

The X-MP EA models run at a clock speed of 8.5 nsec. Entry-level X-MP EA models run at 10 nsec.

### More for less

"This brings more power to X-MP users who don't want to spend the money on the Y-MP," said Marcia Brooks, a supercomputing analyst at International Data Corp. in Framingham, Mass.

Brooks noted that the growth path offered by the X-MP EA should be welcomed by X-MP users, who represent two-thirds of the Cray installed base.

The prices of the extended architecture systems are generally the same as or less than those of the X-MP series, but the new models' memory capacity is up to four times greater.

### Flexibility

"They allow users to migrate from Cray X-MP systems to the Cray Y-MP architecture while preserving their investment in applications software," said Cray Chairman and Chief Executive Officer John Rollwagen in a prepared statement.

The 64-million-word maximum memory on the new models is twice the 32-million-word maximum available on the Y-MP. A word is equal to eight bytes.

A Cray spokesman suggested that the Y-MP maximum memory could be increased in the future.

### Storage device added

Cray also introduced a solid-state storage device, the SSD-5I, a 128-million-word subsystem located within the cabinet of the Cray I/O subsystem.

The SSD-5I is priced at $1.5 million.

In addition, Cray reduced the price of its SSD-7, a 512-million-word model, from $6 million to $5 million.

Cray also announced that it discontinued the SSD-4, a 64-million-word model.

## Lesser bite for memory

*Cray's X-MP Extended Architecture systems feature four times the memory of comparably priced models in the discontinued X-MP series, except at the entry level*

| | Number of CPUs | Memory size (millions of words) | Purchase price (in millions) |
|---|---|---|---|
| X-MP EA/14SE | One | Four | $2.5 |
| X-MP/14SE | One | Four | $2.5* |
| X-MP EA/116SE | One | 16 | $4 |
| X-MP/116SE | One | 16 | $4* |
| X-MP EA/116 | One | 16 | $5.75 |
| X-MP/14 | One | Four | $5.5* |
| X-MP EA/164 | One | 64 | $8 |
| X-MP/116 | One | 16 | $8.5* |
| X-MP EA/264 | Two | 64 | $10 |
| X-MP/216 | Two | 16 | $10.5* |
| X-MP EA/464 | Four | 64 | $14 |
| X-MP/416 | Four | 16 | $16* |

* Discontinued

INFORMATION PROVIDED BY CRAY RESEARCH, INC.
CW CHART

## CORRECTIONS

The vendor of the Vision object-oriented data base is Innovative Systems Techniques, Inc. in Newton, Mass. [In Depth, CW, Feb. 22].

Last week's Page 1 sketch, which accompanied the "True compatibility" story [CW, May 2], was the work of artist Les Kanturek.

# Planning averts disaster at L.A. bond trading firm

BY JAMES A. MARTIN
CW STAFF

LOS ANGELES — The earthquakes that rocked Southern California in October 1987 may have been a blessing in disguise for First Interstate Bancorp.

Around 10:30 p.m. last Wednesday, a fire swept through the 12th to 16th floors of the bank's 62-story downtown headquarters. Temperatures up to 2,000 degrees Fahrenheit raged through the bond trading division — the main occupant of those five floors — destroying a Digital Equipment Corp. VAX, along with Data General Corp. and Prime Computer, Inc. minicomputers and 50 to 70 IBM and compatible microcomputers.

But thanks to a disaster recovery program that had been bolstered following the fall tremblers, the bond trading division lost little data, and interruptions to its operations were minimal.

"The earthquakes last October, in a perverse way, helped us out last week. They raised our consciousness about the importance of disaster recovery," said Mark Barmann, president and chief executive officer for First Interstate Services Co., a subsidiary providing data processing and telecommunications services to First Interstate Bankcorp. "We had tested our business resumption plan just 1½ weeks ago, simulating exercises in the advent of an outage. The exercise proved very timely."

### The backup savior

Data from the bond trading division's minicomputers was backed up daily at First Interstate's data center, located seven blocks away at 1200 W. Seventh St. The day's transactions had been transmitted hours earlier, as usual, to Warrington Associates, Inc. — which is a bond trading time-sharing service in Hopkins, Minn. — for overnight processing.

The bank's main processors, two IBM 3090s, are housed in the W. Seventh St. data center and handle the bank's major applications and data bases — savings and checking accounts and customer loans, to name a few. None of those applications were affected by the fire. Also housed in the center are repetitive DEC VAXs, with Prime, DG and other systems acting as backup.

"There was some loss of intellectual property, but not operational data," Barmann said. Many of the bank's bond traders wrote their own trading analysis software programs on microcomputers, which were destroyed in the disaster.

However, Barmann said, most of the traders kept backup copies of their programs at home. Although the traders' individual records and documents residing on floppy disks did not survive, departmental information remained safe in the off-site data center.

Operations in the bond trading department were disrupted by the fire, but several traders Thursday morning purchased microcomputers and worked from their homes with their software programs, while others set up temporarily at the downtown data center.

First Interstate bond trading offices in London and Tokyo remained open for extended hours late last week to continue the bank's trading activities, Barmann said.

The Warrington time-sharing service normally processes the bond trading division's daily transactions by 4 a.m. and transmits them back to the department's VAX system at headquarters. Because of the fire, the data was downloaded onto magnetic tape and sent by air courier to First Interstate's Los Angeles data center.

> MOST OF THE bond traders kept backup copies of their programs at home and worked from there in the aftermath of the fire.

The VAX at the data center has taken over the role as the bond department's CPU until a replacement system can be brought on-line in the downtown tower. There was no estimate late last week on when operations in the building would return to normal.

The cause of the fire was under investigation at press time, but fire officials estimated the damage at $450 million, making it the most costly high-rise fire in the city's history.

Ironically, First Interstate and the building's co-owner and other major tenant, Equitable Life Assurance Society of the United States, were in the process of installing an internal sprinkler system before the fire broke out. The tower was built in 1974, two years before internal sprinkler systems became a legal requirement. Officials estimated that installation of the sprinklers was about two weeks from completion.

*Staff writer James Daly contributed to this report.*


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# Model 70 to key PS/2 changes

*386-based micro coming in June; IBM seen carving niche with price cuts*

BY ED SCANNELL
CW STAFF

IBM's mythical Personal System/2 Model 70 will finally become flesh and blood early next month.

IBM will announce the system along with several other enhanced versions of the PS/2 family, according to a source who has seen a floor plan for an exhibition IBM is putting together.

The desktop Intel Corp. 80386-based system, long seen as the missing link in IBM's microcomputer lineup, was promised by William C. Lowe, president of IBM's Entry Systems Division, at a technical seminar in Boca Raton, Fla., in February.

At that seminar, Lowe said his firm would deliver a 386-based system "both above and below the desktop."

### The box to beat?

The Model 70 is a key component in IBM's strategy because with its 80386 chip, it is positioned to be the preferred hardware platform for running OS/2, OS/2 Extended Edition and the Presentation Manager operating environment.

Almost every major hardware vendor has announced a 386-based desktop system, with Compaq Computer Corp. having established a sizable lead in that market.

According to Framingham, Mass.-based International Data Corp. figures, Compaq shipped about 70,000 systems by the end of last year, with Zenith Data Systems shipping 22,000.

IBM shipped 40,000 80386-based PS/2 Model 80s last year, but that system is a floor-mount model. Some analysts think IBM will have to run hard uphill to catch Compaq in the desktop 80386 market.

IBM will also unveil an enhanced version of its PS/2 Model 80 that features higher disk capacities, the source said.

The question many observers have posed during the last few months is, How will IBM price the PS/2 Model 70 relative to the PS/2 Models 60 and 80 as well as desktop systems from competitors such as Compaq?

The suggested retail prices of the PS/2 Models 60 and 80 with 44M bytes of memory are $5,295 and $6,995, respectively. Dealers have been discounting both systems heavily, however, recently selling them as low as $2,995 and $5,150, respectively.

Analysts said they expect IBM to lower the prices of the Models 60 and 80 by 10% to 15% next month, making it possible to price a 44M-byte version of the Model 70 between $4,000 and $4,500.

Michael Dell, founder of Dell Computer Corp., recently said he plans to price his IBM Micro Channel-compatible 386-based desktop machine, the System 500, about 30% higher than his IBM Personal Computer AT-bus compatible, which costs about $3,600.

However, some analysts warned that the street price of a Model 70 after a few months on the market will be lower than those of machines from Dell and Tandy Corp.

While most analysts agreed that IBM will increase the new Model 70 and 80s' internal memory capacity to at least 2M bytes, some said the company will not put that many chips on the board for fear it will price the systems out of the market.

"These machines are going to be the primary OS/2 platforms. They have to have at least 3M bytes," said John McCarthy, an analyst with Forrester Research, Inc. in Cambridge, Mass. "I think IBM will have one to two megabytes, with room to expand. They don't want to raise the price too much."

# DPS 8000 series gets two multiprocessors

BY STANLEY GIBSON
CW STAFF

MINNEAPOLIS — Honeywell Bull, Inc. added to its DPS 8000 series of small mainframes last week, introducing the three-processor DPS 8000 Model 83 and the four-processor Model 84.

The new systems are extensions of the single-processor Model 81 and dual-processor Model 82, which were first shipped in the third quarter of 1987. The DPS 8000 series was designed to run Honeywell Bull's GCOS 8 operating system.

The new systems are intended to compete with high-end IBM 4381 models and low-end IBM 3090 models. A Honeywell Bull spokesman said performance of the DPS 8000 Model 84 is between that of the IBM 3090 Model 180E and Model 200E.

Although the vendor declined to name performance figures in millions of instructions per second (MIPS), comparisons with the Models 81 and 82, based on information supplied by the vendor, indicate that the Models 83 and 84 are capable of approximately 7.7 and 8.9 MIPS, respectively.

The systems perform symmetrical multiprocessing, in which several processors share memory and one copy of the operating system. Processors can be upgraded to more powerful models within the family by adding CPU cabinets, according to John Undiano, marketing director of Honeywell Bull's large systems.

### More to come

Undiano said Honeywell Bull will probably announce more DPS 8000 models this year, most likely at the low end of the product family. Undiano explained that the DPS 8000 series was conceived as a growth path for users of Honeywell Bull DPS 8 mid-range systems.

The DPS Model 83 is priced at less than $1.84 million and is equipped with a 32M-byte main memory that can be expanded to 256M bytes, three CPUs, two System Control Units and three I/O processors.

The Model 84 is priced at approximately $2.4 million and is equipped with a 32M-byte main memory, which also can be expanded to 256M bytes, four CPUs, two System Control Units and four I/O processors. Both systems will be available in July, according to the vendor.

Honeywell Bull also announced several mass storage systems. The MSU3390 and MSU3392 can store 2.5G bytes per unit, and the MSU3391 and MSU3393 can store 7.5G bytes. The disk drives are made by IBM and are the same as those sold as the IBM 3380 J and K disk drives.

The Honeywell Bull versions are intended for use with the IBM 3990-type controller at transfer speeds of 3M byte/sec. Honeywell Bull is evaluating whether or not to offer a speed of 4.5M byte/sec. along with advanced cache features promised on a yet-to-be shipped 3990 version.

The disk drives will be available in July. The 2.5G-byte models are priced at $151,700, and the 7.5G-byte versions are priced at $198,000.

Honeywell Bull also announced the MSS8080 storage subsystem, which can hold up to 760M bytes. The subsystem, made by Magnetic Peripherals, Inc., is also slated to be available in July, priced from $78,900.

# Skepticism

FROM PAGE 1

don't know if I could challenge him or not," said Thomas O'Leary Jr., director of MIS at North American Philips Corp. in New York.

### The cloners' claim

The clone vendors are eager to convince users that compatibility is not an issue but merely a marketing cloud raised by IBM to protect its sales. "This is the ninth compatible machine that we've done," said John Patterson, senior vice-president of technology at Tandy. "It's not a whole new technology — that's what an IBM salesman would have you believe; it's just a new bus."

Chips and Technologies, Inc. and Intel Corp., manufacturers of what they call Micro Channel-compatible chip sets, said they have conducted board-level tests for compatibility. Both Chips and Technologies and Intel conceded that their chip sets are not duplicates of IBM's technology.

"In the process of designing our chip set, we did extensive evaluations of IBM's components," said Paul Odolini, general manager of Intel's Microcomputer Division in Folsom, Calif. "But none of the vendors out there has done it the exact way IBM has. There are technologies we have that are better than IBM's, or just different. It doesn't matter how you do it, as long as it's compatible."

> "IF I HAD to make a decision, I would wait to let the market clear itself out."
>
> RICH GONZALEZ
> GREAT-WEST LIFE ASSURANCE CO.

> "THE ONLY WAY to be positive that [a clone] is 100% Micro Channel compatible is to buy all the boards and test them all out."
>
> PETER MOULTON
> MOULTON, MINASI & CO.

### Acid test

With IBM's original Personal Computer, Microsoft Corp.'s Flight Simulator software emerged as a leading test for compatibility: If you could boot up and take off, the system was compatible. But with no original software yet developed specifically for the PS/2, there is no comparable basis for easy evaluation by users.

Users and analysts said they expect that, ultimately, an add-in board exploiting the Micro Channel will fill that need. "The only way to be positive that [a clone] is 100% Micro Channel compatible is to buy all the boards and test them all out," said Peter Moulton, a partner at Moulton, Minasi & Co. in Columbia, Md.

Technology analysts urged caution and skepticism in dealing with compatibility claims. There is more to the PS/2 bus than meets the eye, said Clare Fleig, an analyst with the International Technology Group in Los Altos, Calif.

"The Micro Channel is only one part of the bus," Fleig explained. "The other part is a set of controllers and other micro controller chips designed to do specific tasks."

### The data's there

Clone vendors argued that IBM has made plenty of information available for compatibility testing. "For a change, IBM has fully specified this system," Tandy's Patterson maintained. "I'm more confident that I know what a Micro Channel is than I ever was with the AT bus."

IBM, which has acknowledged that it has held discussions with clone makers about licensing its PS/2 technologies, seems unwilling to clear the air of compatibility questions. It is still running advertisements proclaiming that anyone can take a Micro Channel PS/2 apart, while inferring that only IBM knows how to truly put it back together.

And Leland Reiswig, director of IBM's Entry Systems Division laboratory in Austin, Texas, said last week that IBM will not become involved in the compatibility issue. PS/2 clones will be tested by IBM for patent infringement but not compatibility, he said.

"If a vendor is making broad public claims about compatibility, and IBM knows they're false, we might pay them a visit and discourage them," Reiswig said. "But a vendor's claim is just that — a vendor's claim. It's really caveat emptor."

IBM's position leaves it up to the buyers to issue the stamp of compatibility, and that is not a comfortable task. "If I had to make a decision, I would wait to let the market clear itself out," said Rich Gonzalez, manager of new business administration at Great-West Life Assurance Co. in Englewood, Colo. But if he could not wait, he added, he would try to minimize the risk by selecting a vendor he feels comfortable in dealing with.

*West Coast correspondent Stephen Jones and Senior Editor Ed Scannell contributed to this report.*

# Cullinet's survival strategy under evaluation

BY NELL MARGOLIS
and ROSEMARY HAMILTON
CW STAFF

WESTWOOD, Mass. — All was quiet on the Westwood front at Cullinet Software, Inc. late last week after the company dismissed more than 15% of its work force in its first major layoff.

Although the number of employees slashed from the Cullinet payroll surprised him, "this was part of an absolute necessity to let [the company] survive," said Robert Anderson, an analyst at Sutro & Co. in San Francisco.

Anderson, who said he anticipates black ink on the Cullinet balance sheet in the second quarter of fiscal 1989, noted that "everything that could be done has been done. Now the question is whether the new products can move out into their target markets and be strong competitors."

### Mixed reactions

The customers who will ultimately answer that question expressed mixed reactions to last week's layoffs and corporate restructuring. "I think [the layoffs and the reorganization] are a plus for our decision making," said Tony Grybowski, MIS director at Cincinnati-based Emery Chemicals Division, which is currently evaluating a commitment to Cullinet's IDMS/R data base. "They will be in a narrower area now rather than spread out all over the place. That should mean better support."

David Clark, data base administrator at New Mexico State University, noted that founder and Chairman John J. Cullinane's resumption of his old post after a mini-retirement "indicates that [Cullinet is] on the road back." However, he said, the company's recent volatility is causing him to hold back his final decision on a possible IDMS/R buy.

Dewey Berry, systems manager at the State of South Carolina Educational Department, was similarly stalled by last week's news from Westwood.

The reorganization "does concern me, and I'm being hit with it cold now, so it sets me back," said Berry, whose department recently migrated to IDMS/R 10.2 and is interested in the possibilities of Digital Equipment Corp.'s VAX and IDMS/SQL. "If they're laying off, it sounds like they could be having problems peddling their software. That could cause me to consider another direction more strongly. It could be real good or real bad."

"The new team is in place; the structure is culled of redundancy and ambiguity. We're pulling together and are ready to go forward," said Robert K. Weiler, who emerged from Cullinet's latest corporate reconfiguration as head of a newly defined sales, marketing and support structure, reporting directly to Cullinane.

The overall structural reorganization announced last Monday aligns all development forces under executive vice-president John B. Landry III and all North American customer, marketing and sales support under Weiler, who moved into the newly created position of executive vice-president of North American operations and client services.

The net effect of the streamlining, said Cullinet President George Tamke, will be a $25 million reduction in expenses for fiscal 1989, started May 1.

# AT&T armed for march on Atlanta

ATLANTA — AT&T's Data Systems Group will uncork a product blowout featuring the 3B2/700 minicomputer and a 10M bit/sec. Starlan at Comdex/Spring '88 here today.

An AT&T spokesman confirmed plans to introduce a personal computer, a 3B2 model and the higher-speed Starlan as well as software enhancements to its current Starlan offering; he denied recent reports of a token-ring offering. The 3B2/700 is AT&T's top-of-the-line 3B2 in power and performance, according to specification sheets provided by a source. The 3B2/700 reportedly provides 64 to 80 concurrent users with direct access to 22-MHz Western Electric 32200-based processing speed, math acceleration and 8M to 64M bytes of main memory.

Other features include a range of 5 million instructions per second (MIPS) to 9 MIPS; 600M bytes of small computer systems interface (SCSI) hard-disk capacity; a 120M-byte SCSI cartridge tape drive; a 720K-byte floppy drive; 12 I/0 slots; eight serial ports per card with up to 90 connections; and seven parallel connections.

Users will be able to upgrade their 3B2/500s — but not the 600s — to a 700, according to an AT&T value-added reseller.

AT&T is also expected to announce the following at Comdex:

- A software enhancement to its current 1M bit/sec. Starlan offering, reported to increase performance by as much as 30%.
- At least one addition to its PC line.
- IBM 3270 emulation cards with AT&T's Escort connectivity software.
- Enhancements to other products such as Information Systems Network.


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# COS to referee gripes

BY PATRICIA KEEFE
CW STAFF

MCLEAN, Va. — The Corporation for Open Systems (COS) is planning to unveil a mediation service for users at the Enterprise Networking Event, according to COS sources, which will be held in Baltimore next month.

At least one COS member, Hewlett-Packard Co., thinks the service will be crucial to getting users to accept the Open Systems Interconnect (OSI) communications standard.

OSI supposedly lends itself to interoperability, but users can still expect to encounter some incompatibilities in an OSI-standard environment, conceded Willem Roelandts, vice-president and general manager of HP's Networked Systems Group. The mediation service is expected to ease resolution of those problems.

COS is a research and development consortium consisting of more than 60 vendor and user organizations focused on the development, service and support of systems that test conformance of products to international standards.

Managers at multivendor sites have complained they have difficulty pinpointing trouble spots on their integrated systems and getting help from the vendors involved, which tend to blame each other for problems.

The service would come into play when a user has purchased two COS-certified products from two different vendors and the products do not quite work together, Roelandts said.

Pricing for the service has yet to be resolved.

# Some doubts undermine OSI pep rally

BY PATRICIA KEEFE
CW STAFF

NEW YORK — This year will be a pivotal one for the Open Systems Interconnect (OSI) model, which is expected to move out of the laboratory and into commercial implemention, according to representatives of 12 of the largest systems and communications vendors during a show of support for OSI last week.

But despite what the organizers called an unprecedented show of unity and the emphasis on the importance of standards to U.S. businesses, executives from many of the companies conceded that OSI will see only gradual acceptance during the next five years.

Moreover, executives from IBM, Digital Equipment Corp. and Hewlett-Packard Co. cast some shadow of doubt on the vision of OSI as a panacea to all interoperability problems. They conceded that there will be some compatibility issues, not only between parts of their own proprietary architectures and OSI but between some of the different OSI implementations themselves.

### Giants involved

The industry heavyweights that joined hands at the lavish press briefing were IBM, AT&T, DEC, HP, Unisys Corp., Wang Laboratories, Inc., Xerox Corp., Sun Microsystems, Inc., Data General Corp., Control Data Corp., Honeywell-Bull, Inc. and Telenet Communications Corp. The dozen vendors claimed to represent more than 80% of the computer and communications products and services sold in the U.S. today.

The gathering was intended as an appetizer to the main event, known as the Enterprise Networking Event '88 International, which will showcase a live, multivendor demonstration of the OSI and Manufacturing Automation Protocol/Technical and Office Protocol standards in action in Baltimore June 5-9.

"Nineteen eighty-eight is the knee of the curve [of OSI acceptance and awareness]; it is not a year of big sales," said Willem Roelandts, vice-president and general manager of HP's Networked Systems Group. He explained that the 15 to 20 pioneer user companies that have been testing pilots were expected to make a big commitment to OSI implementations this year.

In addition, vendors said to watch for better OSI products and network management tools as well as lower pricing on their current offerings. This is expected to tempt smaller, less adventurous users who are watching from the sidelines to jump in.

Users currently committed to the Transmission Control Protocol/Internet Protocol (TCP/IP), which competes with Layers 3 and 4 of the OSI model, will move to embrace OSI in the next five to 10 years, the vendors maintained.

As proof, the companies said that all U.S. government procurements will be OSI-based by 1990.

Also, vendor research and development dollars have shifted from TCP/IP to OSI, Roelandts said. And as business moves toward a global ecomomy, users will be more involved with interorganizational systems spanning international boundaries. Standards are a must for successful interaction.

## Power play

*Amdahl seeks features edge over IBM's 3090E systems with introduction of 5990 line and multiprocessing 5890*

| Model | Number of CPUs | Machine cycle time (in nsec) | Performance (in MIPS[1]) | Main memory (in bytes) | Expanded storage (in bytes) | Base price (in millions) | Availability |
|---|---|---|---|---|---|---|---|
| **Amdahl 5890 Model 390E[2]** | Two | 15 | 41 | 256M to 512M | None | $7 | 4Q 1988 |
| **IBM 3090 Model 300E** | Three | 18.5 | 46.9 | 64M to 128M | 64M to 1,024M | $5.6 | 1987 |
| **Amdahl 5990 Model 700** | Two | 10 | 50 | 64M to 256M | 128M to 1,024M | $7 | June 1988 |
| **IBM 3090 Model 400E** | Four | 18.5 | 61.5 | 128M to 256M | 128M to 2,048M | $8.4 | 1987 |
| **IBM 3090 Model 500E** | Five | 18.5 | 70.4 | 128M to 256M | 128M to 2,048M | $9.7 | 3Q 1988 |
| **IBM 3090 Model 600E** | Six | 18.5 | 79 | 128M to 256M | 128M to 2,048M | $10.3 | 1987 |
| **Amdahl 5990 Model 1400** | Four | 10 | 100 | 128M to 512M | 128M to 2,048M | $13.1 | 4Q 1988 |

[1] Millions of instructions per second based on CW estimates
[2] A multiprocessing version of the earlier 5890 Model 300E

CW CHART

# Amdahl

FROM PAGE 1

rumored specs of Summit."

Amdahl will support the ESA operating system after the specifications are made public by IBM, but the company decided not to delay the new series while waiting for its competitor because there were few customers who were immediately interested in ESA.

In addition to IBM's MVS operating system, the machines will be available with UTS, Amdahl's version of Unix.

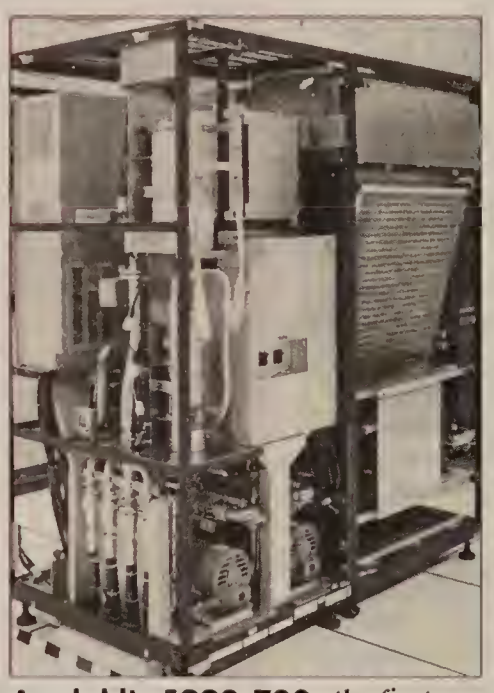
### Power hungry

The lack of beta-test sites will not deter those few companies craving the maximum computing power available, analysts said. "There is absolute demand at the low end" for the 5990-700, said John Jones, a senior analyst at San Francisco's Montgomery Securities, who estimated the machine's performance to be similar to IBM's 3090 Model 600.

Amdahl's Model 1400, Jones said, has the potential to out-perform IBM's Summit series, expected in September. "The issue is not whether you could use [Amdahl or IBM], but whether you could use 115 MIPS," Jones said.

Amdahl is able to reach 100 MIPS and 10 nsec through the use of several innovations, including one borrowed from IBM.

The CPUs are water cooled, like IBM's, but instead of requiring subfloor plumbing, the 5990s have self-contained cooling. The cooling cabinets take up about one-fourth of the 477 square feet of floor space needed for the largest model, yet the entire footprint is about the same size as the company's earlier 5890 series. Other innovations include a CPU on a board. One 42-layer board can support 336 very large-scale integration chips on both sides.



**Amdahl's 5990-700,** *the first computer with self-contained cooling*

The other mainframe announced last week, a 40-MIPS two-way multiprocessor 5890 Model 390E, has about the power of the earlier dual processor but adds storage and channels, the firm said.

Another advantage of the Model 390E is financial: The computer can be partitioned into two environments, but the user only has to pay license fees on one processor. This can save between $5,000 and $30,000 a month, according to Dennis Stein, manager of processor systems marketing.

The 5890-390E starts at around $7 million. Its predecessor, the 5890-190E, starts at $2.6 million and can be field-upgraded to the 390E.

# Amdahl controller gets smart

Amdahl Corp. broke a long silence last week with the expected introduction of an intelligent storage controller and two types of direct-access storage devices (DASD).

Amdahl called its 6100 series a storage processor rather than a controller because of its distributed processor design. Storage analysts agreed that the controller/processor has been enhanced compared with IBM's comparable controller, the 3880.

"But it's hard to say what they've done," said Jim Porter, president of Los Altos, Calif.-based Disk/Trend, Inc. Porter said the most apparent drawback to the controller is that it can only be coupled with Amdahl's new DASDs; he called this a short-term limitation.

Four 6100 models will be available by the end of the year. Amdahl said the models will be priced from $99,000 to $264,000 and have 32M to 512M bytes of shared storage. All have a 4.5M byte/sec. transfer rate.

Amdahl's time line for the next generation of controller, to be pitted against the IBM 3990, is surprising. IBM recently delayed its delivery from August to the first quarter of 1989. Amdahl said it will match that controller with another 6100 model by second-quarter 1989, a short lead time for a plug-compatible company.

J. A. SAVAGE

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| PA | Harrisburg | Jun 23 |
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COMPUTERWORLD

# Net security, ISDN top show agenda

BY KATHY CHIN LEONG
CW STAFF

ANAHEIM, Calif. — Nearly 10,000 of the nation's largest users will convene here next week for the 41st annual International Communications Association (ICA) conference, an event that has grown to embrace voice, imaging and computer products.

Approximately half of the 310 vendors at this year's conference manufacture computer gear, and nearly half of all ICA members are people with MIS responsibilities, according to Robert Eilers, an ICA spokesman.

However, noticeably absent from the vendor roster will be Tandem Computers, Inc., Digital Equipment Corp. and Amdahl Corp. — all previous participants. Those companies said they needed to limit the number of trade shows they attend, and some even noted that the foot traffic was slim last year because users packed the seminars instead of the exhibits.

Many vendors will be touting wares promoting network security, T1 multiplexing and Integrated Services Digital Network (ISDN), including the following companies:

• Popular T1 multiplexer vendor Network Equipment Technologies, Inc. (NET) in Redwood City, Calif., is set to announce a joint-development agreement with a commercial software vendor to create a network management package with expert systems features. The new product will be demonstrated at ICA. According to spokeswoman Sheila Sandow, NET will announce that it is extending its sales and marketing presence overseas and will be providing a new add-on product for its Integrated Digital Network Exchange to provide global T1 connections.

• Timeplex, Inc. in Woodcliff Lake, N.J., is expected to unveil its Link/Design software service, which creates a network layout for corporate customers. Announced in New York last week, the service is a host computer-based network planning tool intended to help users calculate network performance and estimate return on investment for their equipment.

• AT&T intends to roll out three products: a microwave radio system, a voice terminal and an enhanced microcomputer-to-private branch exchange (PBX) interface for users of AT&T System 75 and System 85 PBXs. During the show, the company will demonstrate ISDN Primary Rate Interface and Basic Rate Interface lines on its System 85. A live demonstration between ISDN trial site American Transtech and the booth will show users integrated voice and data capabilities such as automatic caller identification.

• Packet switching vendor Tymnet/McDonnell Douglas Network Systems Co. in San Jose, Calif., will reportedly unveil a network security option for its public network aimed at letting users change their passwords without operator intervention. In addition, the company is set to introduce a software interface that supports another computer vendor's network management architecture. Tymnet refused to discuss which network management package it will support.

• Intecom, Inc. in Allen, Texas, will reportedly announce a major software upgrade that will affect its entire IBX PBX line. The eighth version of the PBX software will upgrade the majority of the features, including automatic call distribution. In addition, the company is slated to introduce network security software on its Lanmark Ethernet network that will let network operators partition segments of the local-area network apart from other users.

# MCI expands T1 line service

WASHINGTON, D.C. — Customers of MCI Communications Corp.'s T1 private line service will be able to get real-time performance monitoring of the MCI portion of their digital transmissions, MCI announced last week.

T1 circuits ordered after today will automatically be equipped with Extended Superframe Format (ESF) monitoring units at each end. Existing T1 circuits will be converted to ESF technology by year's end, MCI said.

The ESF monitoring units collect real-time performance data in a data base, enabling MCI network management and operations personnel to quickly identify and fix circuit troubles, the long-distance carrier reported. ESF is a framing format for T1 circuits that allows for quality checking of digital traffic and the ability to pass error counts to collecting equipment.

In addition to MCI's monitoring capability, customers may perform their own end-to-end ESF performance monitoring by using ESF-capable channel service units, MCI reported.

Later this year, MCI said, T1 customers using IBM's Netview will be able to directly monitor MCI ESF performance data through the forthcoming MCI View interface. MCI View will be commercially available this summer, the company said.




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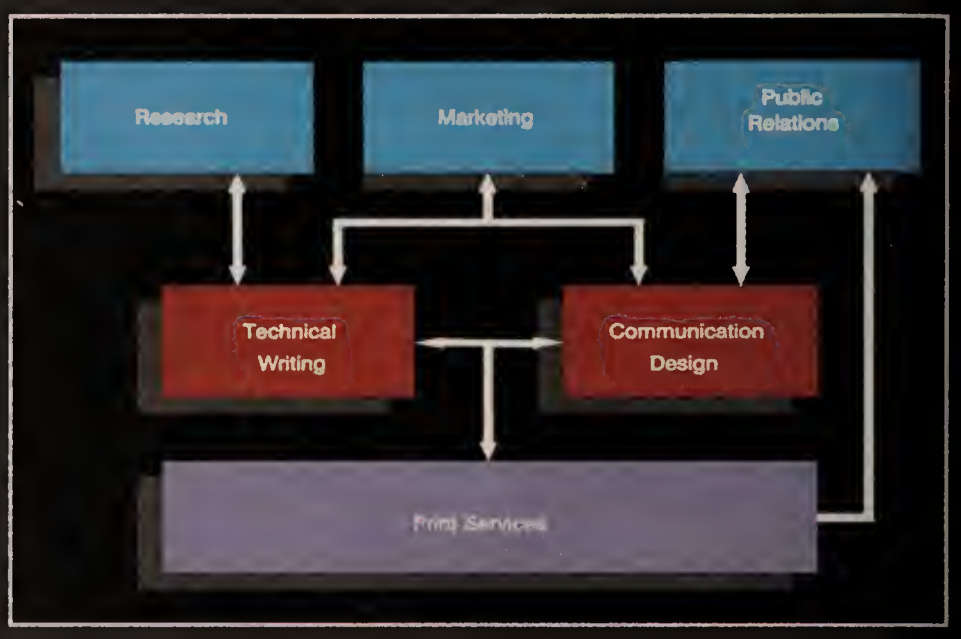
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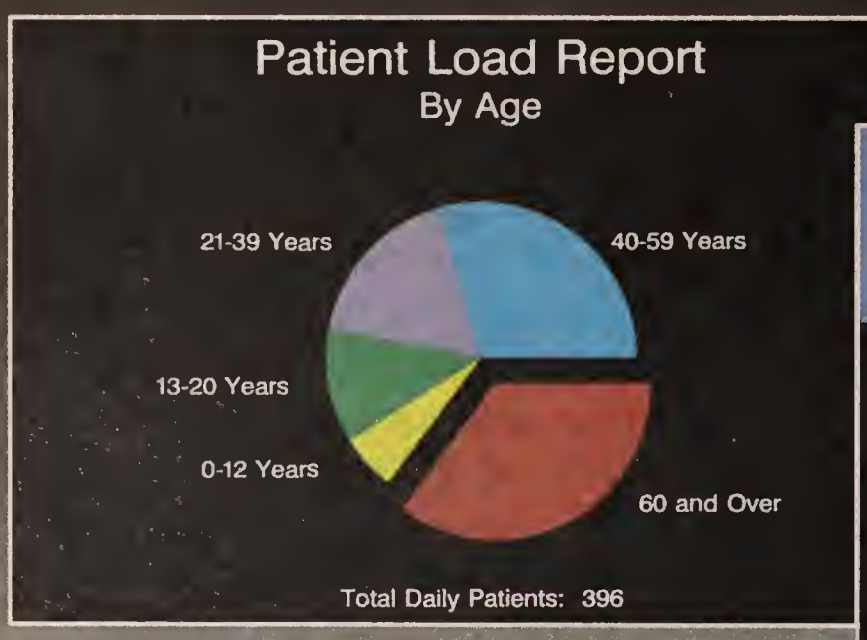


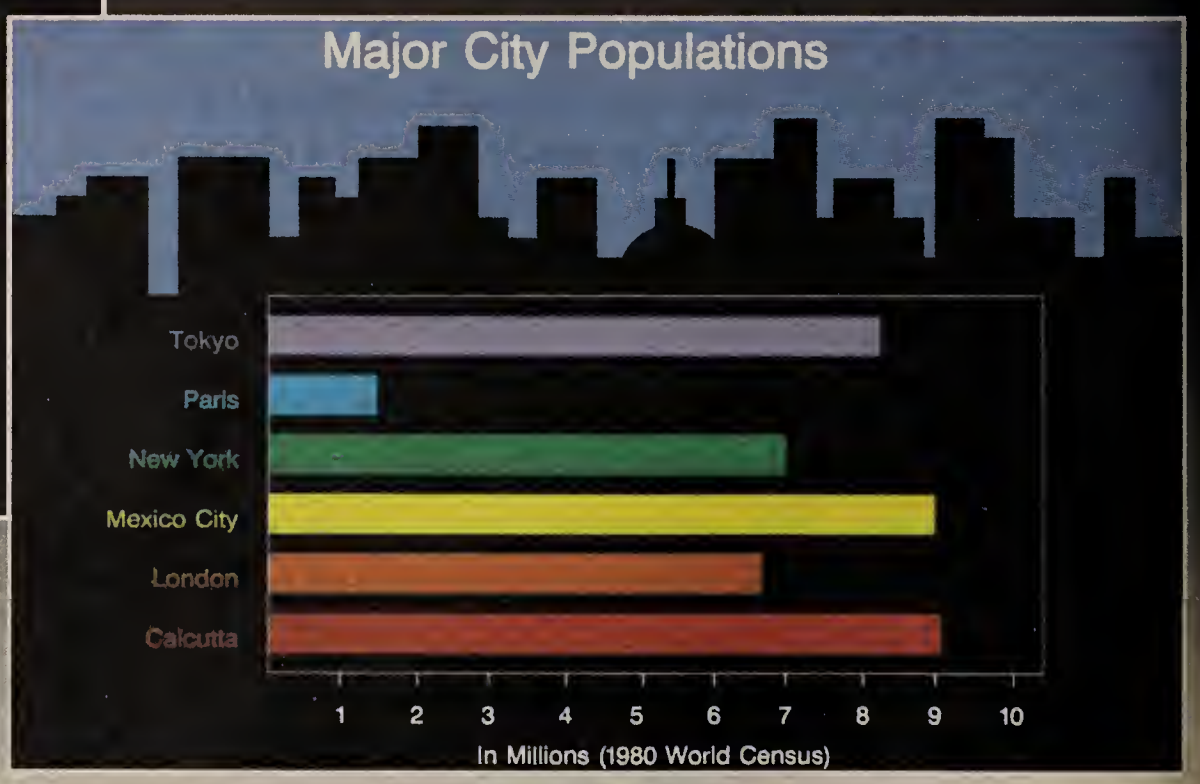


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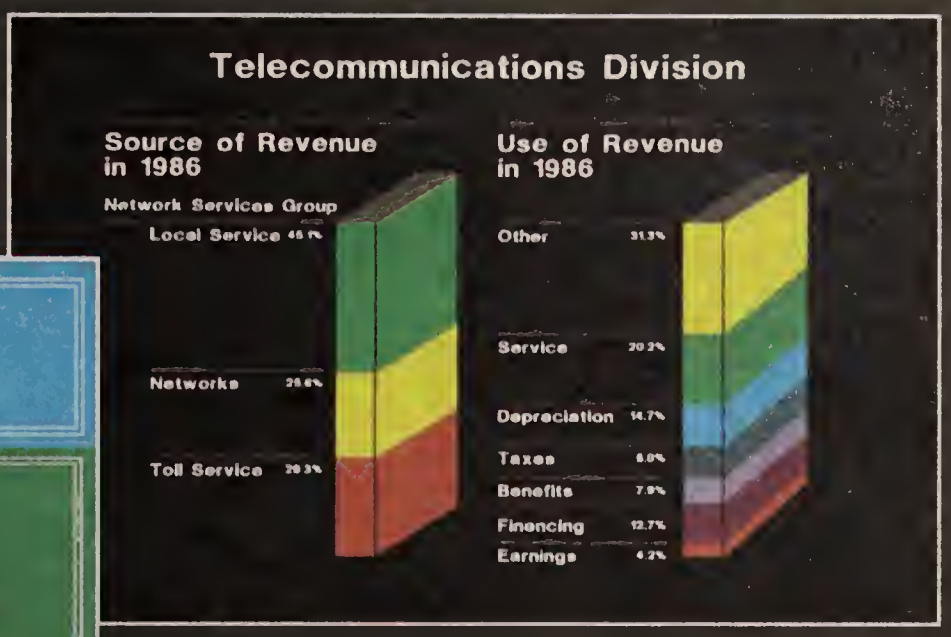



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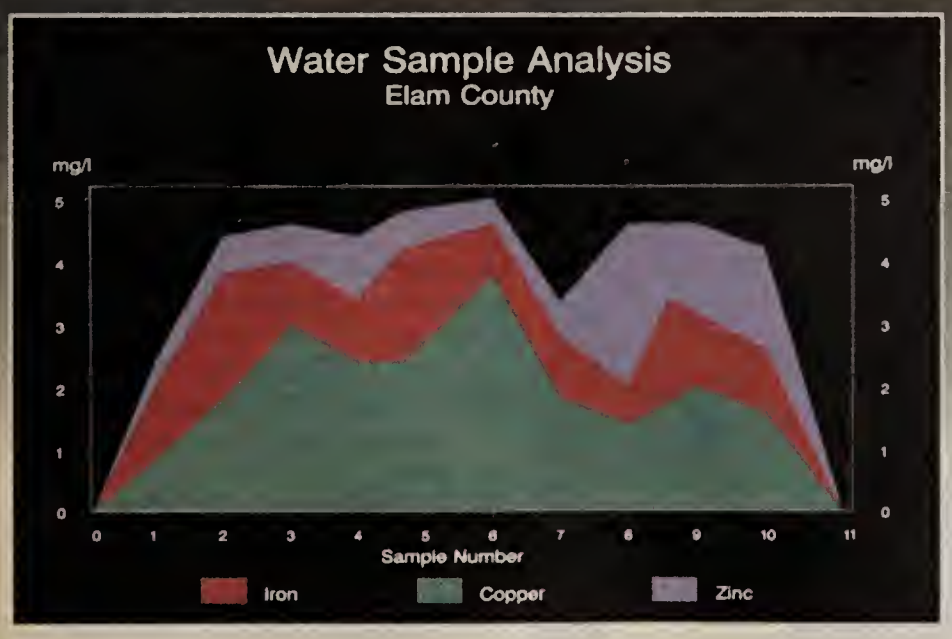


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# Allegis sends Apollo into unfamiliar skies

*Half of United Airlines' reservation system to be sold to other airlines in asset sell-off*

BY JAMES CONNOLLY
CW STAFF

CHICAGO — The parent company of United Airlines last week raised cash and moved to expand its penetration into U.S. and international market segments by selling half of its Apollo computerized airline reservation system to five other airlines.

Allegis Corp. will receive $500 million under an agreement in which United subsidiary Covia Corp., Alitalia Airlines, British Airways, KLM Royal Dutch Airlines, Swissair and USair will form the Covia Partnership. The partnership will run the Apollo system, which is the world's second largest computerized reservation system behind AMR Corp.'s Sabre network. United subsidiary Covia will act as managing general partner.

The sale is part of a 10-month-old sell-off of Allegis assets that has seen Allegis divest itself of Hilton International Co., The Hertz Corp., Westin Hotel Co. and half of Covia for an estimated $4.2 billion.

In addition to raising cash for Allegis, the Covia deal should help Apollo reach new markets and could mean technical improvements for the reservation system, according to airline industry observers.

"It's a pretty good deal for everybody. It's important for cost-saving reasons and revenue-generating reasons to be tied into a major reservations system, and this is heading for being the major system in the world," said analyst David G. Sylvester of New York investment firm Kidder, Peabody & Co.

Analyst Thomas Longman of Bear, Stearns & Co. noted that one key benefit for Apollo is USair's participation. He said USair's strong regional presence in areas such as Pittsburgh and the airline's recent expansion could bring a new set of travel agents into the Apollo network.

The analysts also said the participation of the European airlines will make it easier to carry out the 1987 pact in which Allegis and those carriers agreed to build an Apollo-like European network known as Gallileo.

Longman added that the Covia deal could mean additional investments in Apollo. "I think they are going to build on it. There is no question that out of $500 million, some is going to go into Covia," he said.

### Welcome to the real world

Analyst Jeffrey R. Perry of C. J. Lawrence, Morgan Grenfell, Inc. in New York said the participation of USair and the European carriers is part of a consolidation in the electronic reservations market but, because of competitive factors, a participation that might not have been possible if Allegis had not been recapitalizing its assets. "It's something Allegis probably would have chosen not to do in an ideal world, but unfortunately, it's not an ideal world," Perry said.

He said Allegis receives $500 million without losing any business and also gains the chance to add marketing capability.

Under the agreement, the Covia Partnership will operate the United reservation system, its telecommunications network and associated data processing services and will own the Apollo software and the computer center in Denver.


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# Enertronics plugs in high resolution

ATLANTA — With claims that its product is up to 50 times faster than IBM's 8514/A graphics adapter, Enertronics Research, Inc. is expected to announce its Aurora 1024 here today at Comdex/Spring '88.

The adapter, which St. Louis-based Enertronics said is the first compatible with the 8514/A, will debut May 31.

The company also said the unit is 20 times faster than a video graphics array or enhanced graphics adapter card. It was jointly developed by Enertronics and Acer Technologies, Inc.

The add-on board is intended to give IBM Personal Computer, PC AT and XT users IBM Personal System/2 graphics capabilities with additional enhanced features for applications in desktop publishing, presentation graphics and computer-aided design.

The company said the graphics board is compatible with Enertronics' Energraphics software and with all software written for IBM's 8514/A on the PS/2 through IBM's Adapter Interface. Other drivers can be software-loaded onto the Aurora 1024.

Aurora 1024 features a resolution of 1,024 by 768 pixels and displays 256 colors simultaneously from a palette of 256,000.

The board uses the Texas Instruments, Inc. TMS34010 graphics coprocessor and supports both analog and multisync monitors.

The introductory price will be $999 until Sept. 1, when it will rise to $1,295.

# Hype

CONTINUED FROM PAGE 1

of mouth and the scoop-happy nature of the computer trade and general business press are all to blame for the dramatic rise in the number of end-user misconceptions, MIS professionals said. End users "are basing their thoughts on hearsay, and it just gets passed around," said Jon Seebach, director of microcomputer resources at McGladrey, Hendrickson & Pullen, an accounting firm.

For Ryder's Perera, correcting misconceptions is not only frustrating but time-consuming. "It takes so much time out of DP managers, trying to explain this stuff to the user community," he said. It also puts an added burden on MIS to educate a user base that has learned enough about technology to be both computer literate and computer dumb.

### It's there in black-and-white

Misconceptions are also on the rise because of an increasingly complex computing environment that many end users find both intriguing and difficult to comprehend. But the biggest cause is simply believing what is read or said. "Our users don't apply a healthy dose of skepticism," noted David Renaud, vice-president of technical services at Grinnell Infosystems, Inc.

Just two weeks ago, Julian Horwich got a call from an overly anxious end user looking to buy Ashton-Tate Corp.'s Dbase IV. The only problem is that Dbase IV will not ship for at least three months, said Horwich, a micro manager with a Fortune 100 firm. Ashton-Tate has been advertising "How to buy Dbase IV for $30" but explains in smaller print that the technique is to buy the current version and then upgrade.

For G. Jeffrey Knepper, the problems started last year, when IBM heralded its Video Graphics Array as the new microcomputer graphics standard and a slew of third parties announced and began advertising so-called compatible products. That is when end users began calling Knepper at Touche Ross & Co., looking to buy the new boards. "When we went to look at them, [the vendors said] 'Uh, they're not quite done yet,' " said Knepper, who serves as director of advanced technology-tax at the Big Eight accounting firm.

Misconceptions can sometimes hit a company where it hurts most — right in the wallet. MIS is often called in to fix the problems that emerge when reality does not match the market image. "They might go get a small DEC VAX mini with a software package that looks like the cat's meow. All of a sudden they realize it isn't and come banging on our door," said Michael Heschel, corporate vice-president of information resources at Baxter Healthcare Corp.

Advertising that tells only part of the story is often the culprit, users said. "A user will hear how a DEC box can easily communicate with an IBM box. All you have to do is buy the DEC box and, all of a sudden, all the products that DEC uses can just transfer the data over to IBM," Ryder's Perera said.

Digital Equipment Corp.'s "Digital has it now" ad campaign has put pressure on Frank Diasparra, vice-president of the advanced technology group at Fidelity Investments. "People think, 'Gee whiz, I've been trying to solve this problem for a year with my MIS people.' Then they ask, 'Why aren't we using that technology?' " Diasparra said, adding that few users understand that switching host system suppliers is not an overnight process.

The most common misconceptions concern PCs, PC software and local-area networks, MIS professionals said. Over a business lunch one day, a sales manager asked Perera if he could automate a sales force and tie it to a mainframe, simply by buying 300 laptops. The manager did not know that the process required software and a modem. Why did it sound so simple? "That is exactly what the advertising said," Perera explained.

Another common misconception involves when a user needs to run a piece of software. "Some of our people are a little surprised to learn that not only do you need to do something to the software, but you may well have to change the hardware," Knepper said.

### Treat them like mushrooms

Vendor-generated misconceptions are all too common. Often, vendors advertise products long before they will be available but give the impression that the product is ready to go. Tandy Corp. did just that when it recently began to advertise its Thor/CD erasable optical drive. The ads failed to mention that the product is not scheduled to ship for a year and a half.

Some shops try to nip misconceptions in the bud. For Continental Grain Co., a newsletter for PC users helps put things into perspective.

Manufacturers Hanover Trust Co. has less of a problem than most shops. It is loading up users' PCs with, among other things, Microsoft Corp.'s Windows/386, which provides a whole new interface and multitasking. "We've overwhelmed them. They are too busy digesting what we have given them already," said Robert F. Petrie, a vice-president within the corporate banking sector workstation project at Manufacturers Hanover.

There are some things vendors can do to help solve the problem. One is to be candid about when a product will ship. But Perera has another suggestion. "Like with prescription drugs, where they say check with your pharmacist, the computer ads should say something like, 'Before you think you fully understand this, check with your data processing person.' "


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# Timeplex package cuts net design cost

BY PATRICIA KEEFE
CW STAFF

NEW YORK — Timeplex, Inc. introduced an automated network design tool last week said to enable its users to customize network planning while reducing operational costs.

Offered free as an additional Timeplex service for planning and verifying the efficiency of networks, Link/Design will both increase network uptime and enable users to more quickly revise network plans and implement schedules, the Woodcliff Lake, N.J.-based company claimed.

MIS and network managers are looking for as many tools as they can to help them get a better handle on network costs, said Jeff Kaplan, a senior analyst with The Ledgeway Group, Inc., a consulting firm in Lexington, Mass.

**Proprietary problems**

He lauded the expert system-based Link/Design as an excellent sales and marketing tool that will help Timeplex sell networks while also helping network managers pitch cost estimates to upper management. But Kaplan conceded that the proprietary nature of Link/Design is a "very serious constraint.

"It only helps with Timeplex networks; for users who have multivendor networks, that's a serious problem," he said.

Nonetheless, network design and cost estimate products are a need that T1 and wide-area networking vendors are beginning to address. BBN Communications Corp. has a similar product called Designnet that utilizes artificial intelligence to configure voice and data networks. It is also proprietary.

The need for these products is rising as networks become more sophisticated. Many networks are no longer limited to just voice or data or image, and more and more, users want to manage those elements together, Timeplex said.

Link/Design can reportedly produce an optimal plan for such complex networks within minutes to a few hours.

Users upload network design and configuration data to a Timeplex mainframe, which enacts the various calculations and scenarios.

The end result is a packet of documentation complete with cost graphs, according to a Timeplex spokesman.

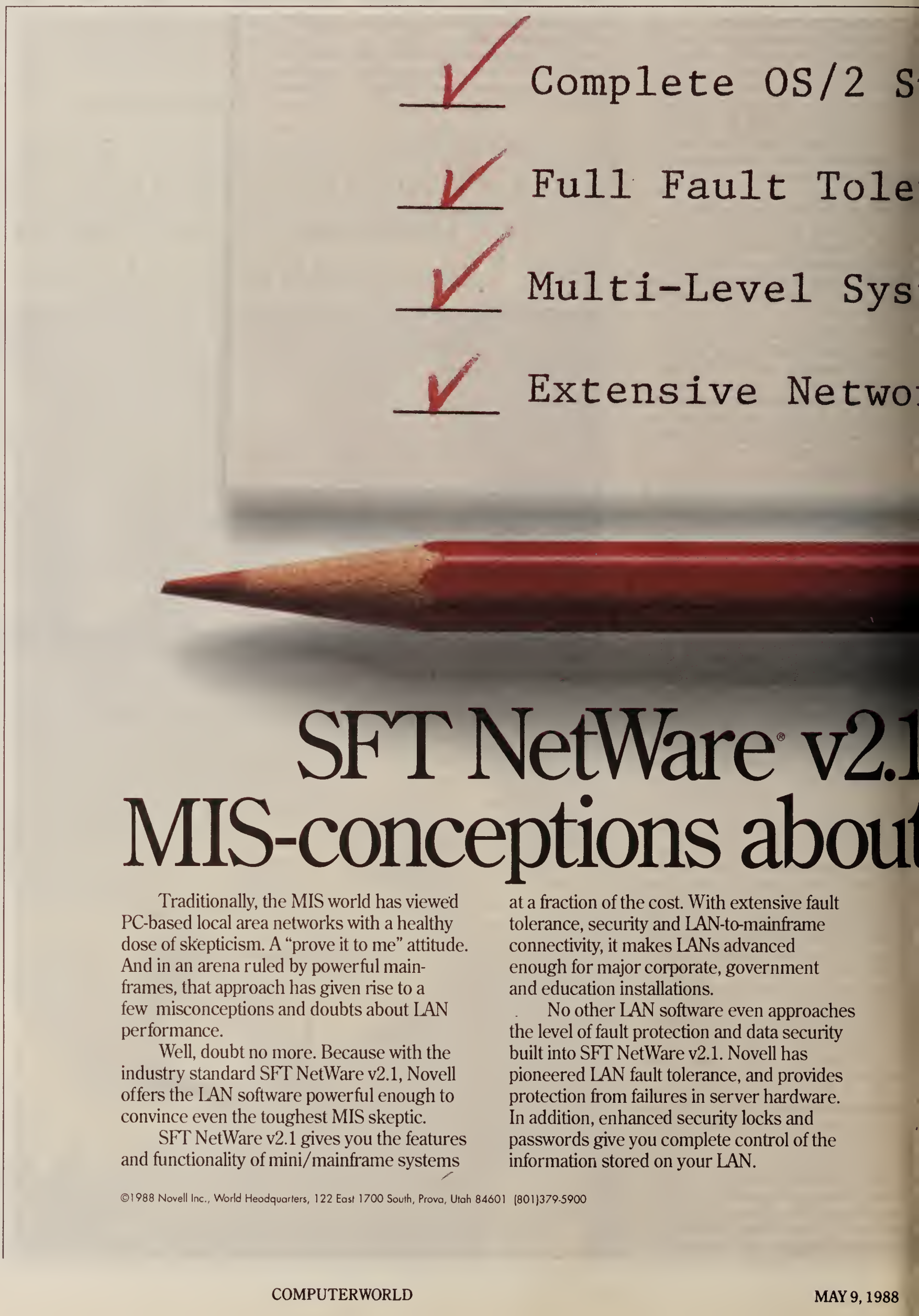
Link/Design provides this information by generating or modifying network topology, finding a minimum-cost network that is tailored to the user's requirements and calculating the payback period or return on investment. In addition, it configures node hardware.

Multiple "what-if" scenarios are utilized to provide planners with a range of alternatives by altering variables and conducting simulations to determine, for example, least-cost routing, the cost of upgrades and what constitutes adequate bandwidth requirements in case of failures, Timeplex said.

In addition, Link/Design incorporates extensive tariff information for different carriers and has the ability to accept cost data for special tariffs and customer-owned facilities.

This flexibility ensures the least-cost routing of any network solution based on the user's real requirements and conditions, Timeplex claimed. In addition, by producing detailed cost and use information before the network is installed, Link/Design reportedly provides communications and MIS staffs with financial information in graphical form that they can take to management to show cost calculations.

Link/Design's capabilities are now available for U.S. and Canadian networks. Next year, the service will be available for international networks.

# Interlink package ties Decnet, 9370

BY PATRICIA KEEFE
CW STAFF

FREMONT, Calif. — Software linking IBM's 9370 to Digital Equipment Corp.'s Decnet was introduced by Interlink Computer Sciences, Inc. last week.

Interlink resells the 9370 as an IBM Authorized Marketing Assistant.

Interlink's Software Network Solution/937X, or SNS/937X, is said to extend the company's VM/Decnet Connectivity software to the 9370 environment.

The SNS/937X package provides a high-speed communications link between the 9370 and systems on Decnet. The software resides on a 9370 connected to Ethernet. Decnet is DEC's implementation of Ethernet.

The software enables 9370 VM users to transfer files, send messages and share hardware resources and applications software between the two environments, Interlink claimed.

Standard features of the SNS/937X include IEEE 802.3 support, 128 simultaneous sessions, an operator interface for monitoring network activity and IBM- or DEC-initiated file transfer.

The standard package costs $30,000 and is set to be available in the third quarter.

Optional features include bidirectional file transfer; full-screen terminal emulation across systems; user application-level program-to-program communications; Mail Bridge for VM Note; and IBM Professional Office Systems to VAX Mail, Decmail and DEC All-In-1 functionality.

Interlink also revealed future product directions for SNS/937X, saying it will add the following capabilities to the software: an interface to IBM's Netview, an LU6.2 interface for DEC's VAX/VMS, network management enhancements and multiple Decnet interconnections.

# Serial port out for PS/2

NASHVILLE — Joining the growing list of vendors selling boards for IBM's Personal System/2 line, Arnet Corp. announced Friday that it has started shipping a serial port board engineered to take advantage of IBM's Micro Channel architecture.

The product, called Multiport/2, provides eight serial ports that allow the connection of terminals, printers, modems and other personal computers to the PS/2 Models 50, 60 and 80.

Multiport/2, which sells for $995, will be important for multiuser systems built around the PS/2 Model 80, according to Arnet President Mike Wells.

"Because up to four Multiport/2 boards can be installed in a single system, 32 users can exploit the multiuser power of one 80386-based microprocessor," Wells said.

The board is targeted at multiuser systems used in vertical markets, small businesses and departments within larger corporations.

Multiport/2 is compatible with multiuser operating systems, including Pick from Pick Systems, PC-MOS/386 from The Software Link and Theos from Theos Software Corp.


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# MIS benefits prove tough to measure

*Top execs say bottom-line contribution is undeniable but often ephemeral*

BY JAMES CONNOLLY
CW STAFF

NEW YORK — Yes, measuring the payoff from information systems remains a challenge. But it can be done in some cases, while in other situations all management really needs to know is that a system makes sense.

Leading MIS executives met in New York last week to discuss maximizing the benefits of strategic information systems. They outlined contributions that systems projects have made to profits but noted that sometimes, the unmeasurable benefits are just keeping the company competitive and making workers more efficient.

"I measure my success on my job very simply: Have I contributed to the wealth of the shareholders?" said John M. Hammitt, vice-president of information management at Pillsbury Co. He said his MIS organization can prove what he conservatively estimates as a $60 million contribution to profits.

"I don't know how you can question the payoff," added Elaine R. Bond, senior vice-president at Chase Manhattan Bank NA, who noted that business computing has gone from "zilch" to a multibillion dollar industry in 40 years. "There is no way it could have grown the way it did if there was no payoff from the technology."

They were among a dozen MIS directors who addressed a *Business Week* magazine conference titled, "The Elusive Payoff in Information Technology."

Laurance T. Burden, corporate vice-president of MIS at Firestone Tire & Rubber Co., said most companies are unclear about the business value achieved from MIS, although top executives realize technology can make or break their company. He said his firm has measured some specific benefits, such as the reductions of inventory and scrap through use of manufacturing automation.

But he warned that strict use of measurements such as return on investment can be a mistake. "I think misuse of financial controls can help you to miss strategic opportunities," Burden said. He added, "One way of measuring the benefits of a new system is to look at the cost of not doing it, the cost of lost business."

Michael J. McLaughlin, senior vice-president for information systems at New York Life Insurance Co., warned, "Estimates for people savings must be practical. It's very hard to save a half or a third of a person."

> "I MEASURE my success on my job very simply: Have I contributed to the wealth of the shareholders?"
>
> JOHN M. HAMMITT
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Darwin A. John, corporate vice-president for information systems at Scott Paper Co., added that the most enduring benefits from systems are human based and build on relationships between MIS and business groups. But he added that those human benefits are more difficult to measure than operational benefits like improved response times.

John P. Singleton, chairman of Security Pacific Automation Corp., said one key step his company took toward quantifying MIS performance was to negotiate detailed contracts with users. He also said he rates his information systems managers as general managers, not as information systems personnel.

Lawrence Bacon, senior vice-president at The Travelers Co., urged senior management involvement in strategic systems, noting that too many such projects are delegated to low-level managers. He also said a key to gaining benefits from a project is to have advocates on both sides of the business-MIS partnership.

Among the executives citing specific benefits was Michael S. Heschel, corporate vice-president of information resources at Baxter Healthcare Corp.

Heschel described his company's ASAP purchasing system and said, "If you take two customers, one on ASAP and one not on ASAP, we can show that the customer who is on ASAP purchases 20% more than the customer who is not." Other benefits include locking in customers, quick delivery, one-stop shopping and better service. He said ASAP allows Baxter to stay a step ahead of its competition.

Heschel noted that not all strategic systems provide long-term competitive advantages, and James R. Kinney, vice-president for information management at General Foods U.S.A., agreed.

"Merely establishing links to a customer doesn't translate into a sustained competitive advantage," Kinney said. Rather, sometimes new systems projects are needed to stay competitive in a market.


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## EDITORIAL

# Anxiety aside

YOU DON'T REJECT a new car because it has a scratch on the fender. It's better to weigh all the features and decide if the deal is a bargain.

Similarly, the Computer and Business Equipment Manufacturers Association should reconsider the U.S. Congress' omnibus trade bill before it decides to reject it because of a single blemish. The trade bill, which has been more than three years in the making, provides for a sweeping overhaul of the country's trade policy. The bill is now on the president's desk, and a veto is expected. That will set up what may be a close battle for an override in Congress.

Among the provisions in the legislation that stand to benefit the computer industry are:

- Requirements that the president get tougher with our trading partners on opening their telecommunications markets to U.S. companies.
- A reduction in export controls on technology sold to Europe and Japan.
- A harmonized tariff system that should reduce record-keeping requirements.
- Strengthening intellectual property rights to fight foreign piracy of computer software.

CBEMA has joined with other business associations in opposing the bill for one reason: It contains a provision that requires large employers to give workers a 60-day advance notice before closing a plant or laying off more than 33% of the work force. Opponents argue that the provision ties management's hands in competitive situations. But the number of companies that will be affected is minuscule. Supporters of the bill say its benefits to the industry far outweigh its restrictions.

The Reagan administration's lackadaisical approach to trade policy has been a thorn in the side of computer manufacturers for years. Trade problems have been blamed for everything from IBM's earnings slump to shipment delays. The bill now before Reagan is what a large and vocal segment of the industry has wanted: a mandate from Congress to get tough on trade issues and to ensure a government role in strengthening U.S. industry.

But the bill is an omnibus measure and can be discarded over a single unpopular item. The plant closing provision doesn't sit well with rust-belt industries faced with intense competition and declining markets. That's understandable. But the computer field, with its historic double-digit growth, has been far less susceptible to such austere measures. It is ironic that the industry that has lobbied for tougher trade policies in the past should now be ready to reject those policies for the sake of a provision that affects only a fraction of its members.

ADAPSO, the computer software and services organization and a voice for another major segment of the industry, has decided that plant closing restrictions should not derail the legislation and has thrown its support behind the bill. CBEMA should review its decision to be sure its opposition is not out of step with the wishes of many of its members.




## LETTERS TO THE EDITOR

### Avoid sexism

I have long maintained that a careful writer can avoid sexist pronouns without substituting awkward constructions. I have always attempted to do so in my own writing. I was thus most disturbed to find that one of your editors changed "rather than blame the boss" to "rather than blame his boss" in my column "Projects from the ground up" [CW, March 7].

*William R. Duncan*
*President*
*Duncan Associates*
*Lexington, Ma.*

### Data base data

In "Micro data base servers are here to stay" [CW, March 7], Richard Finkelstein mistakenly suggested that data base server development began only two years ago.

MDBS III from MDBS, Inc. was introduced in 1981 as the successor to MDBS I, which was available in 1979. MDBS III has had the ability to have a common data base accessed simultaneously by different applications since 1983. In fact, applications can be written in C, Basic, Pascal and several other languages.

Users would be wise to inspect the facilities available to the developer building applications for data base servers. Certainly, data integrity, security and performance tuning abilities will be near the top of the list. Efficient modeling of data relationships eliminates redundancy and dummy-record processing, saving huge amounts of storage space and increasing performance dramatically. Other issues of concern include a vendor's support for various operating environments and its SQL strategy.

As the array of SQL servers are brought to market, users are reminded that mission-critical systems often involve applications whose data base structure requirements do not lend themselves to relational technology.

*David R. Leininger*
*Projects Manager*
*MDBS, Inc.*
*Lafayette, Ind.*

### Security strategy

I am writing in regards to "Voice, finger and retina scans: Can biometrics secure your shop?" [CW, Feb. 15]. Security is not as simple as some automated security companies would like us to believe. Take the case of standard automated teller machine (ATM) transactions.

Entrance to a bank lobby after hours seldom requires more than a credit-card-shaped object. Any object will work — it does not need to be a credit card. What kind of security is this? Banks might as well leave the door open.

Once inside, the standard ATM is slow. To ask for a balance often takes 10 to 15 seconds. It should be displayed in the window immediately, along with other pertinent data. It could be color-coded by industry standards — red is a negative balance, and green means cash is available.

And if a customer does not want other people to see this information, the bank could provide cross-polarized screen filters aimed directly at his eye with computer-controlled tracking that allows only him to see the information.

If a typical ATM transaction is reduced from even 40 seconds to 10 seconds, it would mean one-fourth the vulnerability for the ATM user. This reduced transaction time is an important safety feature that appears to be highly overlooked.

Security is a far more complex issue than just scanning a fingerprint. Ability to track stolen goods is as much a part of security as is guarding the goods in the first place. If a company makes its products totally trackable, they might have no criminal market value.

*Russell Hoffman*
*P11 Enterprises*
*Bridgeport, Conn.*

### Copyright craze

I was interested to see the somewhat cavalier corporate reaction to the Apple Computer, Inc. and Microsoft Corp. litigation on the same page as an article titled "Duquesne raided for Uccel files" [CW, March 21].

While it is a good question about how Microsoft Windows can be copyrighted, it is obvious that software companies are becoming much more proprietary about their software, and corporate America should take notice.

Of course, there is a tried and tested method of protecting the rights of both parties in a license agreement — source code escrow.

*Dwight L. Stocker*
*Vice-President*
*Data Securities International, Inc.*
*New York*

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Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

# Careful now — it's catching

*There's got to be a better cure for piracy than to inflict users with a virus*

BUCK BLOOMBECKER



In his novel *Bugs,* Theodore Roszak raises issues that most users would rather ignore. He suggests that the only thing that might quench the world's seemingly insatiable thirst for computer power would be an intrinsic vulnerability that spread through all systems and made computing more dangerous than it was worth.

Mixing some fanciful allusions to extra-sensory perception with an inspired bit of wordplay, he creates a fictional world in which a child's imperfect understanding of computer jargon leads to an infestation that spreads through computerdom.

With the spate of virus stories appearing in the trade and popular presses, Roszak's book makes for even more compelling reading today, going from horrific science fiction to frightening allegory — or worse.

### Spreading the word

The latest virus story is perhaps the best example of how computer security is being called on to react to the changing nature of our industry. Richard Brandow, editor of Montreal's *Macmag* magazine, deliberately placed a virus program on a computer system that was maintained at the magazine's editorial headquarters.

Office procedures prohibit copying any of the system's contents, but Brandow has been involved in computing long enough to know knew that many people would ignore the prohibition. How many would violate it, directly or indirectly, was a matter of curiosity.

Between November 1987, when the virus was planted at *Macmag,* and this past March, when the virus was activated, the copying proceeded at a fantastic clip.

On March 2, 1988, the first anniversary of the Macintosh II, 350,000 Macintoshes from Montreal to Australia and from New York to San Francisco displayed a simple message: "Richard Brandow, publisher of *Macmag,* and its entire staff would like to take this opportunity to convey their universal Message of Peace to all Macintosh users around the world."

On March 20, the Canadian Software Association gave Brandow an award for his work in fighting computer piracy. The group reported a 13% increase in sales after the results of his "experiment" became public, inferring a cause-and-effect relationship.

Brandow characterizes his work as a strong measure against piracy. "If people are afraid of picking up a virus when they copy software, they will copy less software," he says. The president of the Canadian Software Association obviously agrees.

### Computing quarantine

Am I the only one experiencing deja vu? Is computing about to enter an era comparable to that which dating entered in response to the threat of acquired immune deficiency syndrome?

Consider the parallels:

• **An identified group of scapegoats.** Brandow suggests that viruses will finally give software pirates their just rewards.

• **An impossible strategy as the solution.** If we could get people to practice "safe sex" and use clean needles, the incidence of AIDS could be reduced dramatically. Similarly, pundits at the National Security Agency have opined that if users just followed appropriate software development and acquisition strategies, viruses would present no threat.

Both strategies fly in the face of human nature. Just watch any television program asking teenagers whether they are practicing "safe sex." Readers need only ask themselves how likely it is that their companies, agencies or other employers will install truly effective prohibitions to keep their systems safe from viral infection.

• **A return to basics as a long-term solution.** The shocking thing about AIDS is how dismally our society has failed to communicate the importance of responsibility for one's own life. Why, in the waning years of the 20th century, do we find ourselves unable to learn enough to protect ourselves from a killing disease? What have we been taught since we were in kindergarten?

In the same vein but on the subject of computers, it is truly pathetic that we have installed a new revolution without teaching its participants that property is to be respected, not to be taken at will.

The solution to these problems comes back to teaching responsibility — the responsibility of each individual to his or her own body and of each computer user to the computers he or she owns or operates.

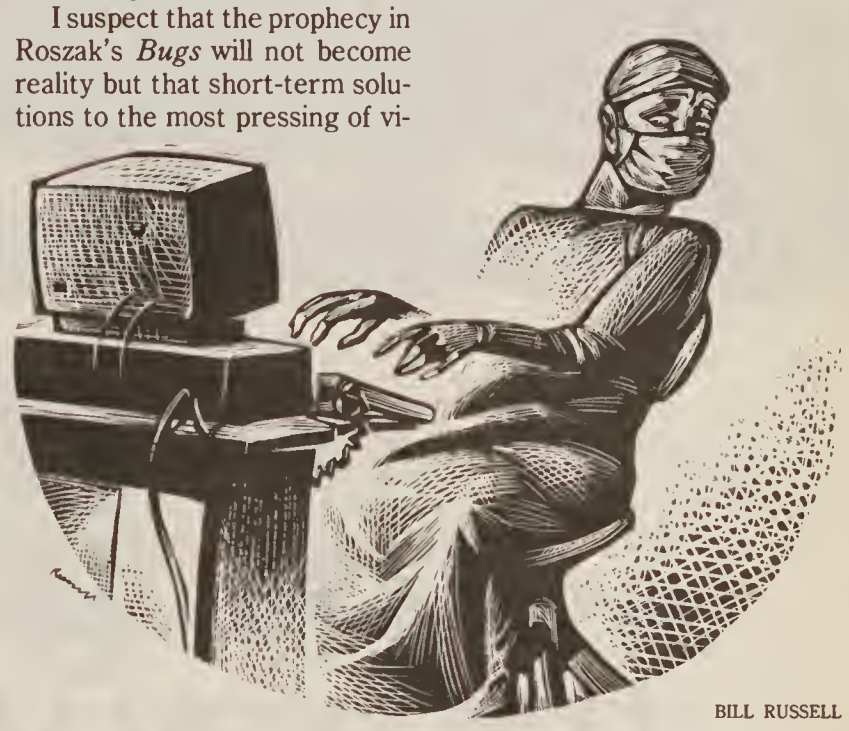
I suspect that the prophecy in Roszak's *Bugs* will not become reality but that short-term solutions to the most pressing of virus problems will begin to appear in those systems that most fear them.

### Is there a pill?

In the long run, however, the message of the current virus scare should be clear to all computer users, from Apple users to Crays. Computers are part of human organizations and will never be safer than the people who operate them.

As AIDS forces us to confront the thorny problems of human nature, so do computer viruses. Some scientists must continue to look for the technological cure, the biological fix, the ultimate inoculation.

As they do, managers and security professionals must deal with the more immediate and more difficult problem of fashioning interim solutions that people will follow until the cure is at hand.



BILL RUSSELL

BloomBecker is director of the National Center for Computer Crime Data in Los Angeles.

# Learning to do what hasn't been done before

JOHN BARNES



Stories have appeared recently in the news about a sort of binational inventions fair for students in upper grade school and junior high. Children from the U.S. and Japan competed in designing and building various original devices.

Most of the Japanese kids built toys — for example, a skiing robot that could slalom. Most of the American kids built consumer products — for example, a diaper with a self-sealing disposable bag.

The newspapers saw these results as a reversal of common stereotypes: "Everyone knows" that American kids just want to have a good time and that Japanese kids are driven achievers. Here was something that flew in the face of what "everyone knows."

I think the American press missed the point — and it is a point that anyone in a high-tech, innovation-oriented environment needs to think about.

Let's first ask two questions: What does it take to make an interesting toy? And what does it take to make a good consumer product?

Among the great consumer products of all time are the safety pin, the staple, the paper clip and the coat hanger — all clever ways of bending a piece of wire.

Now think about a popular toy. It's got to compete with a kid's imagination, do something you didn't think a mechanical device could do.

Which do you suppose took more development time — the robot or the self-sealing diaper?

I hope this analysis will not be taken as slighting the American kids' efforts. Improved consumer products are a good thing from both a business and a creative standpoint. Industrial empires have been founded on identifying one simple need and satisfying it better than anyone else.

These simple innovations require real flashes of genius. There was wire and a real need for small fasteners many millenia before anyone conceived of safety pins.

### Progress through toys

But with all that said, let's consider what building the skiing robot did for the Japanese child.

I suggest that the project was a deeper kind of engineering creativity — the kind that, instead of answering a simple demand, makes a demand on you. It is the kind of idea that you have to grow to meet.

Think about what must have gone into it. The newspaper didn't give any diagrams or explanations, but for a robot to ski a slalom, it has to, among other things, move skis in and out of parallel, stay upright, lean into turns and — if it covers any distance — adjust for increasing velocity.

To make his idea work, the Japanese boy had to solve probably half a dozen genuinely interesting problems. While this requirement does not guarantee that he learned more than the American child as she came up with the improved diaper, it does mean that he had many more opportunities to learn.

There is undoubtedly a bigger market for better diapers than for skiing robots, but what does that matter in an educational setting? When you see that something is possible — but you can't quite see how just now — you are on the brink of some kind of an advance. The things you do to get there may well be as valuable as the goal itself — or even more so.

### To the moon

Recent econometric studies of history indicate that the economic surge of the '60s was not the "Vietnam boom," as has commonly been supposed. In fact, the war, with its accompanying inflation and increasing interest rates, probably cut into the boom.

The upsurge came from the Apollo program. In the process of getting to the moon, thousands of U.S. firms had to learn, overnight, how to do things that had never been done before. Engineers had to be trained in such profusion that for a brief period after the moon landing, there were actually a large number of technically trained people in search of new problems.

A wealth of new technologies entered the public domain, free for anyone to play with, and the range of the doable expanded faster than people could move in to do it.

As long as you keep the orientation toward "Can I eat it for lunch?" you will produce only things with short-run, predictable payoffs. These inventions pay the bills, but in the long run, the competitive edge comes from rolling back the frontiers of the possible.

In schools, industry and government today, not nearly enough attention is being paid to the kind of innovation that demands something of us.

Barnes is the Pacific Northwest area manager for ADG, a high-tech marketing organization based in San Pedro, Calif. His second novel is *Sin of Origin*, published by Congdon & Weed.



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## BOOKS IN BRIEF

**OS/2: A Business Perspective**
*By Dick Conklin*
A detailed introduction for micro users that covers OS/2's expansion of addressable memory, multitasking and user and programming interfaces.

*Paperback, $21.95, 244 pages, ISBN 0471-63503-0, by John Wiley & Sons, Inc., New York.*

**Understanding Hypercard**
*By Greg Harvey*
A guide to using stacks, producing applications and scripting with the programming language Hypertalk. Assumes no programming experience.

*Paperback, $24.95, 493 pages, ISBN 0-89588-506-9, by Sybex, Inc., Alameda, Calif.*

**Software Evolution: The Software Maintenance Challenge**
*By Lowell Jay Arthur*
A methodical approach to software maintenance, with instructions on how to implement and manage the process.

*Hardcover, $36.95, 247 pages, ISBN 0-471-62871-9, by John Wiley & Sons, Inc., New York.*

**Protecting Information on Local-Area Networks**
*By James Schweitzer*
Minimizing information loss, damage and misuse.

*Hardcover, $24.95, 138 pages, ISBN 0-409-90138-5, by Butterworth Publishers, Stoneham, Mass.*

**Encyclopedia of Information Systems and Services**
*Edited by Gale Research Co.*
U.S. and international listings of organizations, systems houses and service organizations, including training companies and software producers.

*Hardcover, three volumes, $400, 1,492 pages, ISBN 0-8103-2532-2, by Gale Research Co., Detroit, Mich.*

# Keeping up with change

**The Information Imperative**
*By Cyrus F. Gibson and Barbara Bund Jackson*
As the title implies, the authors warn that companies and careers could be doomed if they fail to respond to the changes that have reshaped information processing in recent years.

The book represents the outlook of The Index Group, Inc., a consulting firm specializing in information systems planning. Gibson is vice-president there, and Jackson, an independent consultant, used to be.

This well-paced, up-to-date primer on the information technology landscape is directed at two audiences: general business executives and information systems managers, although it is most valuable to general managers. If not particularly colorful, the book is free of both technical jargon and academic constructions.

For the MIS manager, the book's chief value may be in laying out a framework in which to view the field. The authors address the ways information systems can affect a company — by changing products, internal processes and external relationships. They also discuss executive computing, the impact of systems on workers and the implications of MIS organizations.

In the latter discussion, Gibson and Jackson declare that, after gradual centralization followed by a spasm of decentralization, information systems have entered a new age in which the nature of control will vary from industry to industry, company to company and function to function, depending on what approach managers consider best.

They argue that the concept of the MIS organization as a business within a business is no longer appropriate. Rather, the goal should be "seamless integration" of MIS with the business.

The fundamental advice the authors give to MIS executives is to provide leadership of systems while giving up ownership of them.

*Hardcover, $24.00, 153 pages, ISBN 0-669-12338-2, by Lexington Books, Lexington, Mass.*

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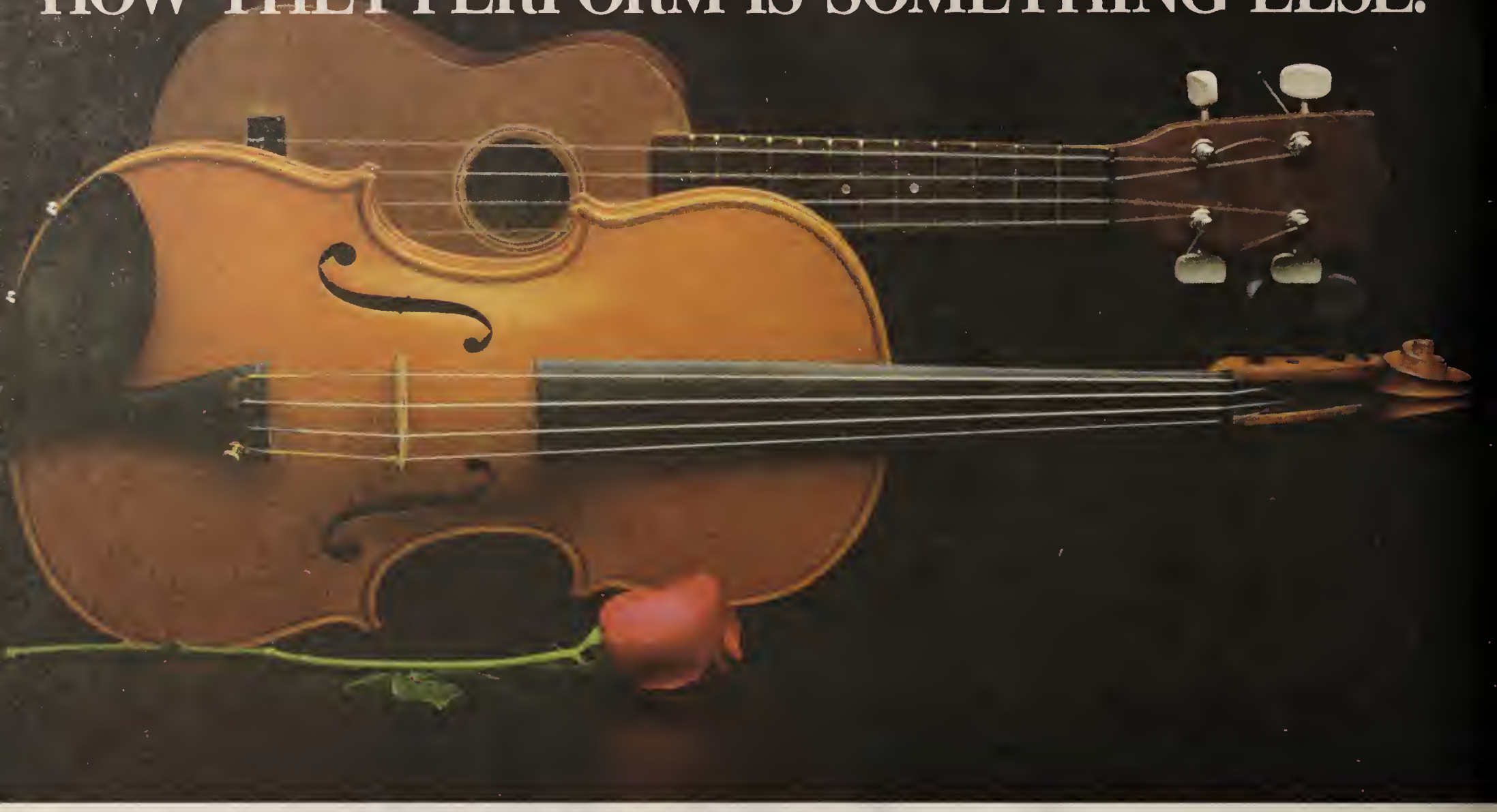
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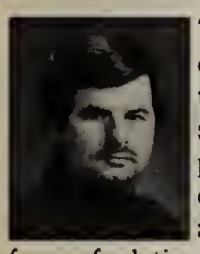
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SOFT TALK

*William Inmon*

# Set-at-a-time ups, downs



The advocates of relational technology cite set-at-a-time processing as one of the chief arguments in favor of relational data base management systems — without acknowledging that this approach can also hinder transaction performance.

If set-at-a-time processing is to be used in the high-performance environment, then changes at the language and/or data base level must be made. Incantations shrouded in the jargon of theoretical relational algebra, waiting for the day when all data bases are put in main memory in a cost-effective manner and relying upon the tooth fairy, just aren't going to cut the mustard.

There is a strong intellectual appeal to the set-at-a-time access of data. When data is accessed one set at a time rather then one record at a time, the programmer is freed from such onerous coding tasks as navigating from one record to the next, checking to see if the record accessed is the latest record and so forth.

The negative performance implications of set-at-a-time pro-

*Continued on page 31*

# Users take their Pick of versions

*So far, little success in search for business operating system standard*

BY ROSEMARY HAMILTON
CW STAFF

To those waiting for a Pick operating system standard to emerge: Sit tight.

The Pick market offers a sharp contrast to many other industry segments, in which users and vendors alike are currently mobilizing to establish standards. In the Pick world, users have expressed little interest in standard-setting efforts, and vendors have made what some observers said is only a half-hearted attempt to provide a Pick standard.

As a result, there remain a number of variations of Pick; this limits portability among the hundreds of Pick applications that exist today.

"There are so many damn versions. Everyone has their own little world," said Ernest Loyer, director of data processing at Gruss & Co., a gas and oil exploration company in New York.

Pick, a business-oriented system with built-in data base management capabilities, was developed by Dick Pick, who founded Pick Systems in Irvine, Calif.

Pick Systems has licensed the operating system to about 30 vendors, many of which package it with hardware and software applications. The sale of Pick systems is expected to generate $2 billion in revenue this year, according to Spectrum Manufacturers Association (SMA).

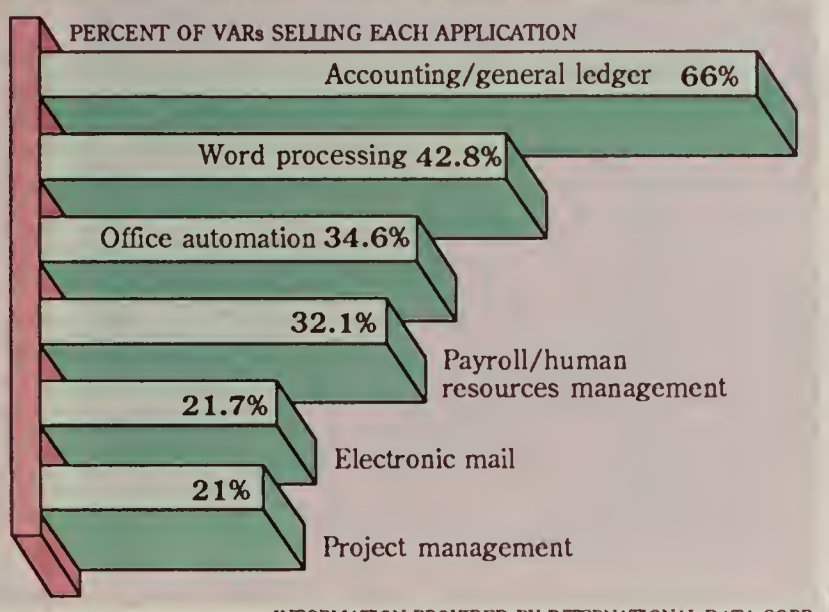
Disagreements between Dick Pick and the vendors have been frequent. The vendors have said the operating system could be promoted better than Pick has done, while Pick has sued several vendors in the belief that they were gaining revenue from the system in products not covered by their licenses. The disputes have not aided standard-setting efforts.

*Continued on page 26*

## Data View

### Accounting tops Unix applications

*Sales by 806 value-added resellers show popularity of accounting and other cross-industry Unix applications*




INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

# DEC expands CASE library

BY NELL MARGOLIS
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. sharpened one of the tools in its computer-aided software engineering (CASE) tool kit late last month, giving software developers and maintenance programmers an enhanced file library system.

Programs in a system under development are stored in the library, with changes recorded each time a program is modified.

VAX DEC/CMS, or Code Management System, one of the six components of DEC's Vaxset

*Continued on page 26*

# Expert systems for end users

BY CHARLES BABCOCK
CW STAFF

NEW YORK — Information Builders, Inc. would like to see expert systems permeate an organization the same way its Focus fourth-generation language and data base management system have spread among end users in its customer base.

To further that goal, it is planning to bring out versions of its Level5 expert system-building shell for the Apple Computer, Inc. Macintosh and IBM mainframe. The Macintosh system is scheduled to debut in June, and the mainframe system is slated for fourth-quarter introduction.

Versions already exist for the IBM Personal Computer and the Digital Equipment Corp. VAX, and last December Information Builders announced a production compiler that allows a Level5 expert system to be disseminated among PC users by binding the expert system to individual desktop knowledge bases, spokes-

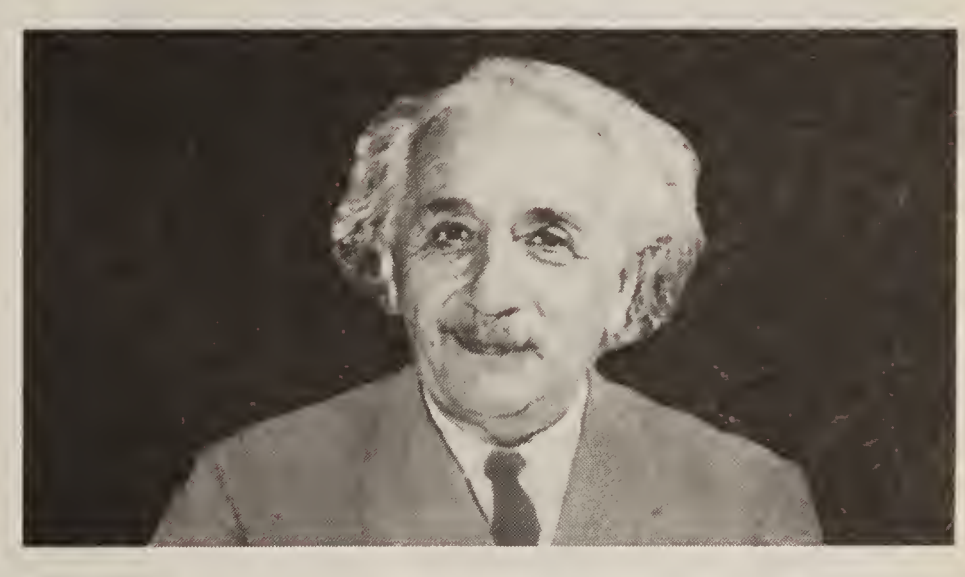
*Continued on page 26*

## Inside


- Impending nuptials between Cognos' 4GL and Interbase's relational DBMS. Page 27.
- Holland Systems extends 4Front Strategy series. Page 38.



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# Users take Pick

CONTINUED FROM PAGE 25

Loyer and other users contacted last week said that while a standard Pick operating system would be helpful, it is not a big factor in their day-to-day business concerns.

As a result, there has been little user initiative to drive a standards effort.

"Right now, portability means nothing," according to Kevin Shaw, MIS director at the Deerskin Trading Post, based in Peabody, Mass. "Maybe it would be if I worked for a third-party software house, but it's not that important to me at all."

Omri Serlin, president of consulting firm Itom International Co. in Los Altos, Calif., described Pick users as "typically small businesses or first-time users that simply want to automate their business."

"These end users are not demanding standards," Serlin said. "They don't have the clout that a large user site might have."

### Common goal

Meanwhile, Pick vendors have been working toward a common Pick environment, but a single Pick version is far from reality. The SMA was formed two years ago by a number of these Pick vendors to aid in establishing a standard operating system.

The SMA strongly objects to the notion that there is not a Pick standard. Since its formation, six specification documents have been released to establish standard methods of addressing basic components of the operating system.

Some observers have argued that this amounts to setting a standard.

"I don't think [the SMA's] heart was ever in a standards effort," Serlin said. "I don't think the appeal was portability. I think SMA was an effort against Dick Pick."

### Standardization a bust?

When asked about the SMA's standardization effort, Ron Mandelik, data processing manager at Statomat-Globe, Inc., said, "I really don't see it."

The SMA has acknowledged that a number of Pick vendors have added their own features to the basic Pick operating system but asserted that a high level of portability does remain between versions.

Observers, however, disputed the claim.

"By my understanding, it would require too much work to move my applications to another system," Gruss & Co.'s Loyer said.

According to Serlin, "The vendors have added features to give themselves competitive edges. So you can't assume applications will run on different platforms."

Gus Giobbi, executive director of the SMA, challenged that claim. "You may have to take a day's effort to port an application, but to me, that's portability."






# Expert system

CONTINUED FROM PAGE 25

man Verne I. Sheidler noted.

"Many organizations have chosen to implement small, manageable tasks as expert systems," and Information Builders sees that effort as "a very key part of our future," Sheidler said.

The Macintosh version will take advantage of the simultaneous windowing offered on that machine, and the system consultation will run in more of a real-time flow than it does on other platforms, he said. It will also be able to access data in Microsoft Corp.'s Excel DBMS.

Information Builders said it is making an effort to provide an expert system sharing capability across the hardware platforms in hopes of becoming the vendor that distributes artificial intelligence to users. Focus users are not automatically prepared to work with Level5, however, as it relies on its PRL language.

Level5 was acquired by the company one year ago. To date, 6,000 licenses have been sold for the $685 PC product. The Macintosh product will be priced between $400 and $700, Sheidler said. The VAX product is priced between $4,000 and $36,000. No pricing has been set yet for the mainframe version.

# DEC CASE

CONTINUED FROM PAGE 25

integrated CASE tool offering, stores project files, tracks changes to them and monitors library access, all of which helps manage files not only when software is under development, but also when it is being maintained.

CMS Version 3.0, which is available this month, expands the user's control over what goes into the library and how it can be manipulated once it is filed there, according to a DEC spokesman. For the first time, for instance, binary or non-ASCII files are eligible for CMS storage. In addition, the library system now supports multiple project libraries.

The latest CMS also lets users access control lists on VAX DEC/CMS commands and specify elements for review before acceptance. As with Version 3.0, according to DEC, CMS users will automatically be notified of any event that occurs in the library. CMS now supports deletions, purging and collapsing of library generations.

CMS license prices range from $1,365 to $43,271, depending on CPU.

# Pact signed to wed Cognos 4GL with Interbase DBMS

BY CHARLES BABCOCK
CW STAFF

Cognos, Inc. will tie its minicomputer fourth-generation language, Powerhouse, to a relational data base management system from Interbase Software Corp. under an agreement announced at the end of last month.

Ottawa-based Cognos is seeking to branch out beyond its Hewlett-Packard Co. HP 3000, Digital Equipment Corp. VAX and Data General Corp. Eclipse/MV minicomputer base and allow programmers to develop distributed, relational applications that can be used up and down the scale of corporate computing, spokesmen for the two companies said recently.

Interbase currently supports access to the DEC relational DBMS, RDB, and DEC RMS files.

Interbase will develop interfaces to other DBMSs, and Cognos will gain the benefit of them once it is interfaced to Interbase, according to company spokesmen.

Cognos's Powerhouse language is able to support DG/SQL, an ANSI standard-compatible product. Cognos calls to the data base can be translated into DG/SQL commands, according to J. Gary Puckering, DBMS product manager at Cognos.

### Access lacking

However, Cognos has not developed a remote data base access protocol that would allow users to develop distributed applications.

The Interbase tie provides Cognos with such a protocol, the Open Systems Relational Interface, which it will build into its product line to open the door to distributed functionality.

According to Puckering, the Open Systems Relational Interface "will enable us to interface to many different relational systems," including a possible interface to a mainframe system such as IBM's DB2.

### Keeping up to date

In addition, Interbase employs a two-phase commit mechanism for distributed updating functions, Puckering noted.

Interbase is the Tyngsboro, Mass.-based company that recently signed a technology agreement with Ashton-Tate Corp., based in Torrance, Calif.

Interbase will be licensed for development on Ashton-Tate's upcoming workstation data base products, according to the company.

# Passport offers accounting suite

BY NELL MARGOLIS
CW STAFF

CHICAGO — A trend toward more business applications on Unix platforms continued this month as Passport Software, Inc. unveiled a 10-module integrated accounting and business suite for the Convergent Technologies, Inc. S series, Hewlett-Packard Co. 9000 series and Honeywell Bull, Inc. XPS-100 series computers.

Available immediately, the accounting modules include accounts payable, accounts receivable, payroll and general ledger.

Aimed at wholesale and retail distribution are purchasing, inventory control, order processing, point of sale and sales analysis modules.

The 10th package is a job-costing module aimed at users in the construction industry.

All 10 packages, according to Passport President John Miller, function on a stand-alone basis. The packages can also be used as an integrated applications system.

In addition, Miller said, each package is built on files that can be transported among all the disparate Unix machines supported by Passport.

The transportation capability is built-in to the software, Miller said, so the only cost to the user is setup time.

The business software suite is already widely installed on the AT&T 3B series, the NCR Corp. Tower, the Unisys Corp. 5000 and IBM Personal Computer compatibles.

Written in structured Cobol, the packages are highly tailorable to the user's particular business environment, Miller said.

About 18 months ago, according to Miller, a Big Eight accounting firm did a controls review of the business applications suite.

All of the firm's suggestions were implemented, resulting, for instance, in a general ledger module that allows users to keep a complete, detailed audit trail and an order entry and billing capacity that gives the user up to eight ways to reflect pricing.

The Passport business applications modules on their latest platform are priced from $895 to $3,000, depending on the module selected and CPU.


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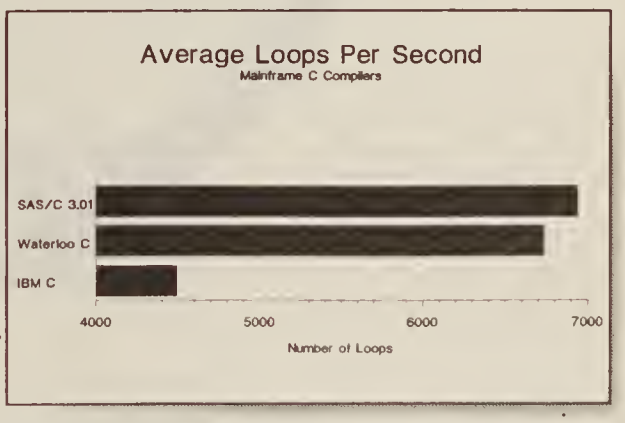
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# Datatalker comes to RDB

BY NELL MARGOLIS
CW STAFF

BERKELEY, Calif. — With the advent of the NLI Datatalker for Digital Equipment Corp.'s RDB, Natural Language, Inc. can claim to have brought a new language to the leading VAX-based relational data base management systems: English.

Introduced in 1986, Datatalker is a natural language interface that employs rules-based reasoning to "understand" the structure and context of colloquial English statements, according to the company.

Relying on such artificial intelligence techniques, the software is able to translate English into SQL, allowing users to access SQL-based relational data bases without having to learn any query language, a Natural Language spokesman said.

### Tailor-made applications

In addition, the package includes the NLI Connector, a tool that lets data base administrators tailor Datatalker to a specific application.

In addition to preparing an application-specific dictionary customizing an SQL interface, the Connector carries on a "dialogue" with the data base administrator to record the definitions of the data base domain.

Previous Datatalker implementations support systems from Oracle Corp. and Sybase, Inc. in addition to Relational Technology, Inc.'s Ingres.

### Good connections

The Datatalker and Connector software system is now also available for DEC's RDB.

Data bases running in clustered or networked systems, said Allen Joseph, the company's sales and marketing vice-president, can take particular advantage of English as a universal language.

Datatalker, with the NLI Connector included, is priced from $4,500 to $80,000, depending on the CPU.

# Cincom enhances Control facility

CINCINNATI — Cincom Systems, Inc. recently made available a facility to manage engineering change-order data within its manufacturing software package.

The addition to Control:Manufacturing Version 6.1 runs on both Digital Equipment Corp. VAXs and all IBM 370 hardware. It will be offered at no extra cost to existing users.

The engineering change-order facility will enable manufacturers to stay more up to date on design revisions, according to Cincom. "This is the first step in helping to coordinate the design aspect with the manufacturing aspect," said Eric Lange, computer-integrated manufacturing program manager at Cincom.

Cincom, in conjunction with Intergraph Corp., has developed a prototype interface that will allow engineers to directly send engineering data, including change-order information, to a manufacturing application.

With last week's release, users will be required to manually input the engineering data into the engineering change-order facility of Control:Manufacturing.

The facility manages the engineering change data for the manufacturing process. It allows users to account for information such as title of design, status, origination, priority, planned implementation date and estimated product cost. Users can also cross-reference the affected parts and revision levels.

Release 6.1 ranges in price from $100,000 to $400,000.

# Global ships sales package

RALEIGH, N.C. — Global Software, Inc. recently began shipping an applications package for the IBM System/38 that combines sales, purchasing, distribution and financial modules.

Integrated Sales-Distribution-Purchasing (ISDP) system ranges in price from $80,000 to $110,000, depending on the configuration.

An order processing and billing component allows users to split orders into shippable units and prints order documentation, such as invoices and shipping bills, spokesmen said.

An inventory module is best suited for companies that have multiple warehousing operations, Global said. It offers management of inventoried items and items on order, in transit or damaged stock.

The sales analysis component allows users to maintain a sales history that includes a compilation of up to 99 months of invoice history, a 24-month summary that links a customer to items ordered and sales by product line and by customer and commission calculations.

The purchasing application allows users to keep track of orders and the performances of vendors, Global spokesmen said. An accounts receivable module is also included in the ISDP package.

Global has provided an ISDP package for IBM mainframes. The System/38 version is interactive and is built on a data base structure, the company said.




# Inmon

CONTINUED FROM PAGE 25

cessing stem from the fact that transactions that do set-at-a-time processing inevitably use an indeterminate number of resources.

One transaction specifies a set size that requires only a modest amount of I/O.

The next transaction executes the same code but specifies a set that requires an enormous amount of I/O.

Consider the following simple pseudocode:

```
SELECT NAME ADDRESS
FROM PERSONNEL.FILE
WHERE YEARS_OF_SCHOOL>n
```

Where n equals 17, there are only a few people who have graduate or post-graduate degrees, and the resultant set size is small.

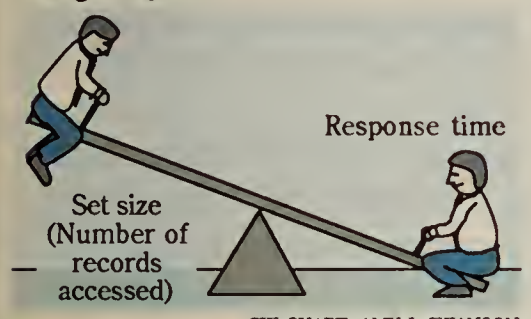
But where n equals 11, there are many people who have gone to high school, and the resultant set size factors out as large.

Note that the code did not change, but the work done by the system to service the code changed dramatically because of the different parameters that were passed to the code.

How important, then, is controlling a system that contains transactions that consume an indeterminate amount of resources, as is typical of set-at-a-time processing? The control of resource utilization of such a system is vital to on-line performance.

**Performance seesaw**

***When set size goes up, response time goes down; when set size goes down, response time goes up***




CW CHART: AMY J. SWANSON

The essence of on-line performance is consistency, and consistency of performance cannot be achieved when there is a mixture of transactions that use indeterminate amounts of resources.

### A major roadblock

Just how important an impediment to performance is a transaction that uses many resources? Very important. Transactions that use many resources in and of themselves consume lots of I/O. In addition, those transactions are slow, even if they are the only transactions running in the system.

In addition, upon the occasion of locking data, long-running transactions freeze a lot of data, and they freeze it for a long period of time, and they also get in the way of fast-running transactions that are queued behind the long-running transactions.

In short, not only do long-running transactions run slowly, but they also prevent fast-running transactions from ever having a chance to go into the execution phase.

There is, of course, the argument that with enough machine resources, there can be a smoothing out of the differences between long- and short-running transactions.

To some extent, it is possible to smooth performance with a large amount of machine resources. But such a smoothing requires the availability of many slack machine resources idly waiting for the spike in resource utilization to occur.

It is not cost effective for organizations to hold massive amounts of machine resources in an idle state just waiting to smooth out the differences between long- and short-running transactions.

### Action, reaction

There is another way to view the relationship between transaction throughput and the set size accessed by a transaction.

The chart at left shows a teeter-totter with transaction throughput on one end and set size on the other.

When the amount of processing required to handle set sizes goes up — as when a long-running transaction goes into execution — transaction throughput goes down.

When set sizes are small — as when the system is running transactions that require few resources — transaction throughput goes up. To achieve consistent high response time, then, requires that all set sizes accessed be small and consistent.

The necessity of keeping the access and manipulation of set size small in a high-performance environment is reinforced by the examples of widely publicized relational systems that have previously been used in high-performance environments.

Across the board, when relational systems have achieved high performance, it has been because the application had a natural limitation on set size.

Consider three applications in which relational technology has been touted as a high-performance DBMS: debit and credit processing; bank teller processing; and credit verification processing.

In each case, the calls done by the application access sets of data populated by one row or, at most, only a few rows. In debit and credit processing and bank teller processing, the set accessed is the account being accessed. In credit verification processing, the referencing of only one customer is questioned at a time.

In short, the applications naturally limit the set size being accessed, and the indeterminate resource utilization that is characteristic of set-at-a-time processing does not appear.

### Setting limits has consequences

The implications of limiting set sizes are subtle. For example, typical activities such as relational joins, ad hoc queries using the dynamic interconnectability of relational data and free-form end-user access of data are not done when high performance is being achieved.

The instant the system begins to use the natural set processing capability of relational technology — exploiting the flexibility of dynamic relationships — set sizes begin to be unpredictable and performance suffers.

If its advocates are serious about using relational technology for high-performance systems in general rather than the limited examples that have been publicly aired, then some modification to set-at-a-time processing languages must be done.

For example, there could be a limitation on the number of occurrences of data accessed in a set, even if the entire set of data specified in the call was not accessed.

On the other hand, some amount of record-at-a-time processing could be incorporated with set-at-a-time processing, when performance is critical.

When one gets creative, there are many solutions to the performance inadequacies of set-at-a-time processing.

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Inmon is a senior principal with American Management Systems in Lakewood, Colo., and an author on the subject of data base design.

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# NEW PRODUCTS

## Systems software

A program for automatically compressing IBM VSAM disk files on that firm's DOS/VSE systems is available from **B. I. Moyle Associates, Inc.**

**Bim-Pack** affects system and application performance by allowing faster I/O and reduced I/O contention.

The vendor estimated compression results in file disk space at 35% to 70%.

The product is transparent to programs accessing files.

Bim-Pack is priced at $8,000 for a permanent license or $4,000 per year.

B.I. Moyle, 5788 Lincoln Drive, Minneapolis, Minn. 55436. 612-933-2885.

## Applications packages

**Unipress Software, Inc.** has ported its **Unipress Emacs** multiwindow text editor and its **Unipress Q-Calc Standard** spreadsheet to Sun Microsystems, Inc.'s Sun386I workstation.

Unipress Emacs is said to provide a range of Unix program development and editing facilities, including the ability to view and edit several files simultaneously.

Unipress Q-Calc Standard is a Unix spreadsheet that features a Lotus Development Corp. 1-2-3 work-alike interface, according to the vendor, and is 100% compatible with 1-2-3 files.

Unipress Emacs binary code costs $395 on the Sun386I; Emacs source code costs $995. Q-Calc Standard costs $595.

Unipress, 2025 Lincoln Highway, Edison, N.J. 08817. 201-985-8000.

Version 1.3 of **Anvil-1000MD,** which the vendor calls a "2½-dimensional" mechanical computer-aided design (CAD) package, is available from **Manufacturing and Consulting Services, Inc.**

For use with IBM Personal Computer ATs, AT compatibles and most Intel Corp. 80386-based systems, Anvil-1000MD lets users create designs and transfer them with the Anvil translator to workstations, superminicomputers and mainframes running Anvil-5000 3-D CAD packages.

Six preprogrammed sets of drafting standards have been added. The program supports IBM Video Graphics Array and Enhanced Graphics Adapter standards, the vendor said.

Anvil-1000MD 1.3 carries a price of $2,995.

Manufacturing and Consulting Services, 9500 Toledo Way, Irvine, Calif. 92718. 714-951-8858.

An updated release of graphics software for engineering workstations has been introduced by **V. I. Corp.**

**Dataviews 6.0** creates interactive computer graphics for depicting, analyzing and regulating applications.

The package runs under Unix or Digital Equipment Corp.'s VMS and supports workstation architectures from Sun Microsystems, Inc., Apollo Computer, Inc., Hewlett-Packard Co. and others.

A subroutine library incorporates I/O capabilities, and the package also provides graphical control of layout, interaction management and event synchronization.

Targeted uses include real-time financial analysis, process control, instrumentation, simulation, command and control and network monitoring.

Dataviews 6.0 is priced beginning at $7,700.

V. I., Amherst Research Park, Amherst, Mass. 01002. 413-253-3482.

**Thorn EMI Computer Software, Inc.** has released another version of its Time Intelligence package for organizations running IBM's MVS/TSO.

**Time Intelligence MVS/TSO** enables users to store and manipulate business data using their fiscal year and reporting cycles, the vendor said.

The package supports sales analysis, forecasting, profitability reporting, strategic planning and market research applications. In addition to MVS/TSO, the product is available in versions for the IBM Personal Computer AT, the MVS/CMS environment, the Digital Equipment Corp. VAX, Hewlett-Packard Co. machines and the Wang Laboratories, Inc. VS series.

Time Intelligence costs $2,000 to $70,000, depending on the operating environment.

Thorn EMI, 285 Mill Road, Chelmsford, Mass. 01824. 617-256-3900.

**National Business Systems, Inc.** has announced a version of its Total Office Support System (TOSS) that supports IBM's VM/CMS environment.

**VM/TOSS** integrates data processing, word processing and all communications facilities into one system and was designed to operate within an organization's existing IBM hardware and software environment.

Office automation capabilities include electronic file folders, a user directory, bulletin boards and distribution lists.

VM/TOSS costs between $9,000 and $36,000, depending on configuration.

National Business Systems, 30 Tower Lane, Avon Park S., Avon, Conn. 06001. 203-677-8396.

**Libra Corp.** has announced **Release 2.0** of its **Payroll System** for IBM Personal Computers and compatibles as well as multiuser versions for Novell, Inc.'s Networks and Digital Equipment Corp.'s VAX series.

New features include one to 99 companies and 20 to 999 expense codes. Also, 99 transaction files have been added to proofing, posting and tax calculation.

Payroll can be set to run with or without security, and Release 2.0 has a report formatter with a "what-you-see-is-what-you-get" style.

The Libra Payroll System 2.0 price begins at $1,800 for a single-user system.

Libra, 1954 E. 7000 South, Salt Lake City, Utah 84121. 801-943-2084.

**Cognition, Inc.** has announced **Mechanical Advantage 2.0**, a mechanical computer-aided engineering system for the design, optimization and analysis of product designs.

Version 2.0 includes geometric modeling, a design library, team design, automatic tolerance and sensitivity analysis.

The package performs automatic calculation of complex physical properties and enables the user to model, analyze and animate both kinematic and rigid body motion.

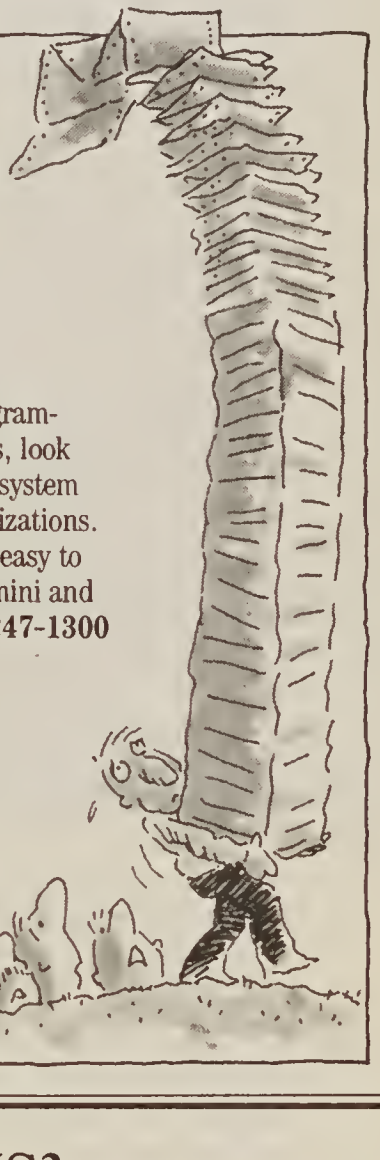
The platform supports Sun Microsystems, Inc. Sun-3 workstations and Apollo Computer, Inc.'s 3000 and 4000 series.

Pricing for Mechanical Advantage 2.0

*Continued on page 34*


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*Continued from page 33*
starts at $16,500 per workstation.

Cognition, 900 Tech Park Drive, Billerica, Mass. 01821. 617-667-4800.

**Datalogix Formula Systems, Inc.** has enhanced its Process System software, designed for formula-based manufacturing companies.

**Process System 3.0** offers several new modules, including Process Manufacturing Resource Planning, Master Production Scheduling and Process Capacity Requirements Planning.

The package consists of 1,500 integrated programs for process manufacturing, distribution, financial and accounting functions in addition to regulatory compliance.

Process System 3.0 costs from $50,000 to $350,000, depending on hardware and application requirements.

Datalogix, Suite 200, 200 Central Park Ave., Hartsdale, N.Y. 10530. 914-997-1627.

## Languages

**Statistical Data Research, Inc.** has announced **Rfile**, an RPG-II-to-information file-transfer program and language emulator. Rfile converts RPG source code, screens, procedures and data files into Prime Information and Info/Basic.

The product converts most RPG commands directly into equivalent Info/Basic statements, maintaining the original RPG flow of control. Screen formats are translated into separate Info/Basic programs that emulate the functions of the IBM System/34 and 36 screen handler, duplicating the passing of fields to and from the program.

A license costs $10,000 and includes four weeks of conversion assistance.

Statistical Data, 4434 Carver Woods Drive, Cincinnati, Ohio 45242. 513-984-5355.


**SCIENCE/SCOPE®**

A new cabin control system for Boeing's 747-400 jumbo jetliner uses all-digital technology to perform a wide range of passenger service functions previously unavailable. The Advanced Cabin Entertainment and Service System (ACESS), designated the APAX-140, extends the application of digital multiplexed techniques to such functions as cabin interphone, lighting, and advisory signs. Other features include an interactive, two-way capability that allows passengers to communicate back to a central computer for in-flight ordering of specific goods and services, and a self-test function that monitors and records faults while in flight. Hughes Aircraft Company, supplying multiplexed passenger entertainment and service systems since 1970, designed and built ACESS for Boeing.

A radar mapping mission to Venus will provide pictures sharper than any previous spacecraft sent to the planet. NASA's Magellan Mission will carry a Hughes synthetic aperture radar (SAR) and altimeter antenna to photograph and transmit Venusian geological data which was previously unobtainable. From its polar orbit, SAR will be able to detect an area as small as Dodger Stadium in Los Angeles, California, depicting it as a single dot. As the SAR antenna illuminates a 15 mile-wide area with rapid radar pulses and records the returning signals, the altimeter antenna will be used to construct a topographic profile of the planet. The Magellan Mission is scheduled for launch in 1989.

Hughes has designed and built a common set of core modules to reduce cost and increase reliability in U.S. military aircraft radar systems. Instead of using unique modules for each aircraft, a Standard Avionic Module (SAM) format is used, permitting the core modules to be interchanged in Programmable Signal Processors (PSPs) for the U.S. Air Force F-15's APG-70 radar and the Navy F-14D's APG-71. A SAM consists of two printed circuit boards mounted on both sides of a flow-through heat exchanger, with VHSIC-level integrated circuits in rows on either side of the SAM. Significantly fewer module types need be created and debugged, resulting in a more mature design and production base.

A new advanced launch system (ALS) design for the U.S. Air Force will use off-the-shelf engines combined with modular configurations to reduce current launch costs. Hughes' ALS design will use a modified version of the Pratt & Whitney RL-10 liquid hydrogen/liquid oxygen rocket engine, with different numbers of modules tied together, depending on payload weight. The Department of Defense and NASA will require payloads ranging from 40,000–250,000 pounds to be placed in low Earth orbit. Aiding in cost reduction, the new design also features recovery of much of the booster. Hughes expects to meet the requirements for the ALS with its modular design by the mid-1990s.

A broad spectrum of technologies, many of which grew up within the past five years, are represented in the products of Hughes' Industrial Electronics Group. Six divisions and two subsidiaries, each operated like a small high-tech company but backed by resources of its multibillion-dollar parent, offer career benefits to qualified engineers and scientists. Advancing technologies such as microwave and millimeter-wave communications, silicon and GaAs solid-state circuitry, fiber optics, and image processing equipment are pursued in facilities located in many of Southern California's most desirable coastal communities. Send your resume to A.T. Moyer, Hughes Industrial Electronics Group, Dept. S3, P.O. Box 2999, Torrance, CA 90509. Equal opportunity employer. U.S. citizenship required.

For more information write to: P.O. Box 45068, Los Angeles, CA 90045-0068

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## Utilities

**Computer Associates International, Inc.** has announced **CA-Spoolman Release 1.3**, a spool management facility for the IBM VM environment.

Release 1.3 provides real-time monitoring and extensive viewing capabilities of VM spool activity. It lets users view open or closed console and reader files and define multiple secondary operators for any number of virtual machines.

CA-Spoolman also provides reál-time monitoring of total spool space use. Full-screen capabilities include scrolling, forward and backward searching and sorting.

CA-Spoolman Release 1.3 costs $3,510 to $8,190, depending on CPU model.

Computer Associates International, 711 Stewart Ave., Garden City, N.Y. 11530. 516-227-3300.

**Advanced Software Products Group, Inc.** has released **Version 2.0** of **DASD Trak**, a utility for monitoring direct-access storage device use. DASD Trak provides precise measurement and logical DASD space allocation, prohibiting users from exceeding their DASD limit, the vendor said.

Designed to complement existing tools, DASD Trak uses the DASD monitor table in main memory.

DASD Trak costs $9,500 for the first CPU and $6,650 for each subsequent CPU.

Advanced Software Products, Suite 401, 2335 Tamiami Trail N., Naples, Fla. 33940. 813-649-1548.

A library utility program for the IBM System/36 has been announced by **Mid-States Computer Corp.**

The **Libdir** package has the ability to display or print a library directory of all or date-selected members by most recent change in date and time, according to the vendor.

In addition, the product reportedly will copy to a target library all members that have been changed from a designated time or date.

Libdir also may be incorporated into an existing library backup plan.

Libdir carries a price of $99.

Mid-States Computer, P.O. Box 1564, Grand Island, Neb. 68802. 308-381-0737.

# "The Data General difference: responsiveness across the board."

**Rod Bosscawen, Senior Vice President, NCNB National Bank of North Carolina**

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## In less than 30 days from date of order, Data General computers were processing 10,000 loans for NCNB National Bank of North Carolina.

With nearly 600 branch offices, NCNB National Bank of North Carolina is one of the largest banks in the southeast, and among the top 20 in the country.

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Within one month of order, Data General had an MV/Family system for over 60 people up and running. (Others had estimated 6 months to do the same job.)

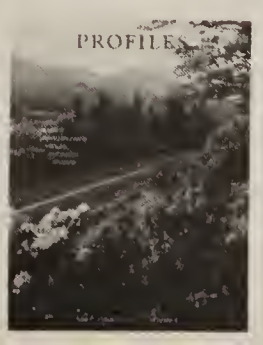
The NCNB system was so user-friendly, it required only a minimum of training for the bank's personnel to operate it proficiently.

In no time, they were servicing loans, processing payments and receivables in a way that exceeded all expectations.

Says Rod Bosscawen, Senior Vice President at NCNB:

"Data General's ability to respond quickly and provide support on a broad-based front helped NCNB establish a loan-processing operation in record time. Without their commitment and performance, the accomplishment of this would have never been possible. We are extremely impressed."

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A troubleshooting software system for diagnosing and repairing machine failures and processing problems has been jointly developed by **Carnegie Group, Inc.** and **Texas Instruments, Inc.**

**Testbench** captures information from repair documentation to guide technicians through diagnostic and repair sessions. The system runs on the TI Explorer symbolic processing workstation and IBM Personal Computer ATs and compatibles. It is jointly marketed by Carnegie Group and TI.

The first-copy price for Testbench will start at less than $42,000.

Carnegie Group, Five PPG Place, Pittsburgh, Pa. 15222. 412-642-6900.

TI, MS 2240, 1250 Research Blvd., Austin, Texas 78769. 800-527-3500.

## Data base management systems

**Compuserv Data Technologies** has announced a fourth-generation language and data base management system for supporting applications that integrate heterogeneous Digital Equipment Corp. VAX software and data.

The **System 1032 End-User Facility** is an add-on module to the company's System 1032 fourth-generation language/DBMS; it permits users to execute relational joins across any grouping of heterogeneous data. The product links 1032 and RMS data files into views to create a consistent interface.

Licenses for the basic System 1032 cost from $3,000 on a DEC Vaxstation to $120,000 on a DEC VAX 8800. The System 1032 End-User Facility costs an additional 10%.

Compuserv, 1000 Massachusetts Ave., Cambridge, Mass. 02138. 617-661-9440.

## Development tools

**NCR Corp.** has introduced **NCR Union**, a development platform that allows NCR 9800 programmers to use Unix-based tools to create applications. The product also offers gateways into local- and wide-area networks.

NCR Union connects the NCR Tower 32/600 to the 9800 interprocessor bus and has software and hardware components designed to operate within the 9800's modular, open-ended architecture.

The software offers a variety of Unix-based tools and program applications, including office automation, spreadsheets, extended languages and decision-support tools.

NCR Union costs $13,000.

NCR, Dayton, Ohio 45479. 513-445-4169.

**Holland Systems Corp.** has extended its 4Front Strategy series of information tools with the addition of the **Insurance Prototype Model**.

The vendor claimed the product provides a starting point for the systems planning process and contains application representations most common to an insurance company, including claims processing, human resources, life and health, actuarial, underwriting and policy issuance.

Activities contained in the Insurance Prototype Model can be tailored to the individual company, and the product will identify areas requiring better information support.

An optional supplement to the 4Front Strategy series, the Insurance Prototype Model is priced at $29,500.

Holland Systems, Suite 303, 3131 S. State St., Ann Arbor, Mich. 48108. 313-995-9595.

**Softool Corp.** is now marketing the **Computer-Aided Compliance** turnkey for DOD-STD-2167A, a tool for automating compliance with the Department of Defense's 2167A standard for development and maintenance of mission-critical computer software.

The product provides support for complete life cycle and project control, requirements management and tracking, synchronized activities, status accounting and auditing.

The tool costs from $38,000 to $75,000.

Softool, 340 Kellogg Ave., Goleta, Calif. 93117. 805-683-5777.

**Teradata Corp.** has announced the **Transparency series**, a release of software products allowing the vendor's DBC/1012 to process SQL requests from applications originally written for other data base management systems, such as IBM's SQL/DS and DB2.

The software maps the Application Program Interface provided by other DBMSs to that used by DBC/1012, eliminating the need for a custom interface program.

Pricing for the Transparency series starts at $25,000.

Teradata, 12945 Jefferson Blvd., Los Angeles, Calif. 90066. 213-827-8777.

A cross-reference utility for NCR Corp. VRX/Boss3 programmers is being offered by **Ivan Software, Inc.**

**Ivan/Xref Release 1.0** produces a three-part report.

The first part of the report is an INTL/6 program listing. The second part is a cross-referenced list of all defined labels; the third is an alphabetical list of all procedure names and their location in the INTL/6 directory.

Ivan/Xref costs $1,500.

Ivan Software, 973 E. Congress Park Drive, Dayton, Ohio 45459. 513-436-4826.

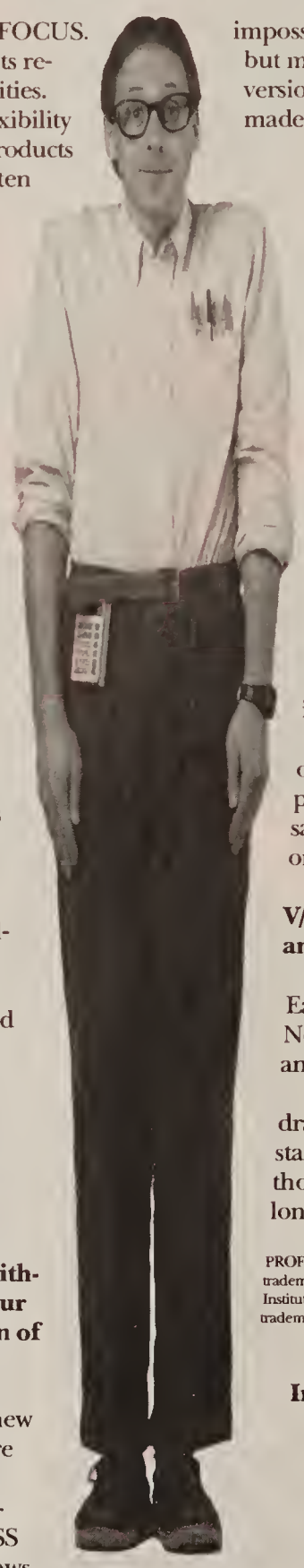

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**Test new software releases without having to shut down your current production version of the product.**

Have you ever compromised new software testing because DCSS are so uncompromising?

V/SEG's Alias Assignment feature provides a DCSS renaming capability that allows you to thoroughly test new software releases in parallel with your full production versions—something that is normally impossible with DCSS-resident programs. Not only that, but most testing is transparent to the users and faulty versions can be easily backed out while corrections are made.

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**Prevent an overlapping of DCSS in virtual memory.**

Would you like to decrease the time spent planning and managing DCSS definitions while increasing user satisfaction?

V/SEG's Autofit feature automatically scans multiple copies of a DCSS program to find a copy that won't destroy another DCSS in a user's virtual machine. This greatly reduces the planning and management normally associated with DCSS definition and maintenance.

In addition, V/SEG creates a visual display of DCSS by virtual storage. This improved mapping utility cuts the time needed to allocate new saved systems and to adjust the location of existing ones.

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*Douglas Barney*

## Copy a plea for 1-2-3



**Lotus's head software honcho listens to CW.** A couple of weeks ago, we pleaded with Lotus to drop its copy protection on existing versions of 1-2-3 in anticipation of the tardy Release 3, which will be unprotected. We also asked any users who agreed to call Lotus and tell 'em CW sent you. Well, Frank King, the new head of all software development at Lotus, read the item and promises to work on the problem.

If King can dump protection pronto, and if the company announces a cheap upgrade to Release 3 for existing customers, and if the firm throw in an add-in or two, then Lotus stands an excellent chance of keeping Borland's Quattro and Microsoft's Excel at bay.

**Ouch!** Random-access memory-resident software is notorious for interfering with the more mundane elements of computing, such as creating a document, working with a spreadsheet or sorting a data base.

Now come reports that a new highfalutin' RAM-resident package may wreak havoc with disk caching software. Accord-

*Continued on page 49*

# 1-2-3 add-in binge

*Lotus racks up applications support*

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp.'s 1-2-3 Release 3 may be months away, but that did not stop 10 add-in makers from staging a pep rally for the product and its new programming language last week.

While current add-in products are written using Lotus macros or assembly language, the next generation will use the Lotus Extended Application Facility (LEAF), a combined programming language and applications programming interface.

Although LEAF is a language, developers can write add-in programs in C or assembler as well as in the LEAF language. As a result, users and developers will not have to learn the LEAF language to write applications that tie in to 1-2-3.

### A familiar crowd

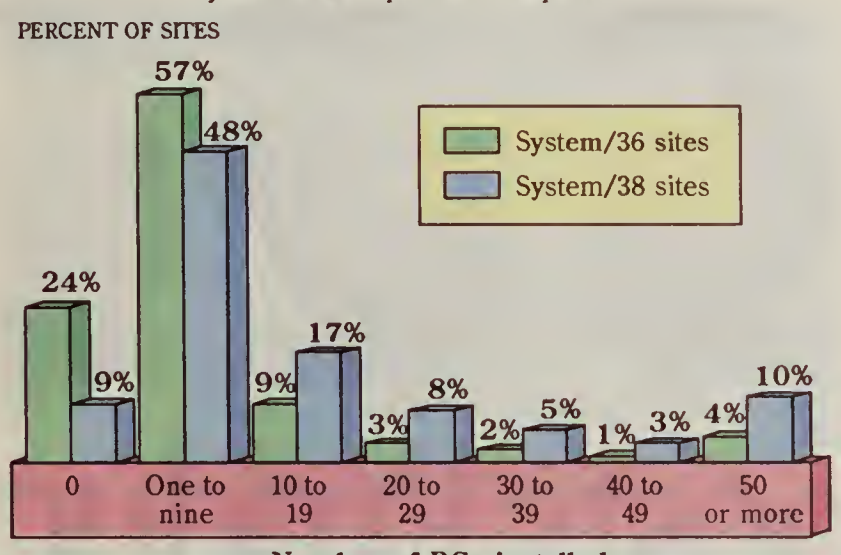
The Who's Who of Lotus add-in makers that converged in Cambridge included Funk Software, Inc.; Intex Solutions, Inc.; Turner Hall Publishing; Frontline Systems, Inc.; Macropac International; Manusoft Corp.; PC Publishing, Inc.; Personics Corp.; General Optimization, Inc.; and Goldata Computer Services, Inc.

*Continued on page 56*

## Data View

IBM mid-range shops sport few PCs

*Most IBM System/36 and 38 sites run fewer than 10 personal computers*




INFORMATION PROVIDED BY COMPUTER INTELLIGENCE

# Mitsubishi laptop offers big picture to business

BY ED SCANNELL
CW STAFF

TORRANCE, Calif. — Taking a page from IBM's recent advertising campaign, Mitsubishi Electronics America, Inc. will be asking users to take a look at "the bigger picture."

Last week, the company announced a laptop system with an 11-in. diagonal black-on-white screen that boasts a 12-MHz version of Intel Corp.'s 80286 processor with one wait state. Users can also operate the machine at 8 MHz with zero wait states, Mitsubishi said.

Christened the MP286L, the 15-pound system's standard memory configuration is 640K bytes but can be expanded to 2.6M bytes through one of four proprietary expansion slots.

The system is bundled with Microsoft Corp.'s MS-DOS 3.3 and will run Microsoft and IBM's OS/2, although the company warned that users will require

*Continued on page 56*

# Micrografx, IBM team up against Apple

BY ED SCANNELL
CW STAFF

RICHARDSON, Texas — Micrografx, Inc. is set to announce a souped-up version of Designer next week that will make IBM's Personal Computers more serious competitors to Apple Computer, Inc.'s Macintosh in the graphics workstation market, according to the company.

Version 1.2 of Designer, which is intended for both technical draftsmen and commercial graphics users, is expected to compete against Illustrator, a Macintosh-compatible program from Adobe Systems, Inc. Designer 1.2 has some features not yet available on the Macintosh.

"Not only does it have the same capabilities [as the Macintosh] from the standpoint of doing high-quality art work, it also brings the same ease of use which is the whole motivation for using the Macintosh," said Micrografx President George Grayson.

For example, company officials said, Designer offers on-screen what-you-see-is-what-you-get text editing. Both Illustrator and Aldus Corp.'s Freehand require users to enter

*Continued on page 54*

### Inside


- Ex-IBMer King faces new challenges at Lotus. Page 41.
- Planning tool lightens paperwork load. Page 50.
- Epson enhances AT compatible. Page 58.



# IMS DB/DC on a PC? It's here *now.*

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- MFS support for 3278 Models 2, 3 and 4
- /FOR and /EXIT commands
- Input/Output message queuing
- Dynamic cursor positioning
- Dynamic attribute modification
- Process limit count
- PCB status reporting
- DB/DC call tracing
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As a result, programmer productivity at Holly Farms has reached an all-time high. "We've seen substantial improvement ratios," Clontz said. "In the time a programmer might turn out one CICS command-level program, he can turn out from six to eight programs on MANTIS."

Most of the 500-plus MANTIS applications now in production at Holly Farms are aimed at streamlining costs. For example, Data Processing used MANTIS to develop a model of how chickens consume feed over the course of their lives, allowing Holly Farms to cut production at one of its feed mills by 1½ days a week.

"We've got key users who are picking up on the term 'MANTIS,'" Clontz noted. "Around here, MANTIS has become a synonym for 'get it done quickly.'"

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SMALL TALK

*Julie Pitta*

# No doubt what's Next



One of the worst-kept secrets in the computer industry is Next, Inc.'s first product introduction. Industry watchers have been tracking Apple cofounder Steve Jobs' new venture with vigor. In fact, it seems that the only thing that remains a mystery is when the Next machine will finally make its bow.

Next has kept its audience waiting. The product was expected to debut in April 1987 but has been held back to allow Next engineers to tinker with it further. In the interim, financing from Electronic Data Systems founder H. Ross Perot has kept Next afloat.

Industry watchers believe the Next system will be introduced sometime this summer; some predict it will be launched as early as next month.

**Educated guess**

Speculation has it that Next will launch a Motorola 68030-based system with high-resolution graphics running the Unix operating system. Although Jobs initially indicated he would target higher education, few believe he will limit his marketing efforts to universities.

"He'll be forced to sell to a more general-purpose market," says Bill Lempesis, an industry analyst at Dataquest. "The volumes just aren't there in the education market to sustain a company like Next. He'll have to market it to business, govern-

*Continued on page 54*

# 'Developer's developer' Frank King cranking up code for Lotus

IN PERSON

IBM has rarely been noted for blockbuster software, but don't tell that to Frank King. While at IBM, King spearheaded the development of two critical and surprisingly successful mainframe products, DB2 and SQL/DS, and is generally regarded as the father of the IBM RT Personal Computer.

Most recently, King served as vice-president of IBM's Entry Systems Division. There, he helped devise OS/2 Extended Edition, a set of data base and communications components that may well be the first major application written specifically for OS/2, beating a host of microcomputer vendors at their own game. King proved one thing while at IBM, analysts say: He can get the job done.

As newly appointed senior vice-president of Lotus's Software Products Group, King faces a familiar challenge: getting key products to market in a timely fashion. A self-described "developer's developer," King intends to crank out promised products while also serving as an advocate for Lotus programmers.



**King's reign** *at Lotus heavy on discipline, development*

King spoke with *Computerworld* Senior Editor Douglas Barney about Lotus's approach to software development.

**Why did you join Lotus?**

I'll tell you how [Lotus Chairman Jim] Manzi recruited me. It was totally out of the blue. I had a really good job at IBM and was enjoying life. I came up here to see some of the new products, some that are announced and some that aren't.

That is the way to get me interested; I am basically a technology-driven person. It was also being in an environment where I could have more impact than an IBM environment, which is much bigger.

**Why did Manzi come after you?**

Lotus needs a developer for the developers. I speak their language. My background is software, and I am a computer scientist by training. Being a champion of technology is another role.

Also, Lotus is moving into an environment where a lot of the things we are doing are application systems. I have experience in that. That means the development teams tend to get larger, have more interdependencies and require more process.

**What do you mean by applications systems?**

Instead of just having point products, we are developing a set of products that work across a set of platforms and work together along with a set of extension fa-

*Continued on page 56*

# Typing tutor teaches, sings and burns rubber

BY JAMES A. MARTIN
CW STAFF

Need to learn how to type? Call Mavis.

Mavis Beacon Teaches Typing, from The Software Toolworks in Sherman Oaks, Calif., is a popular software package that uses artificial intelligence techniques to help users improve, or acquire, typing skills. Although the program is promoted as an entertaining tutorial, users said Mavis has proven invaluable in giving previously inexperienced office personnel and middle managers alike better typing and microcomputer skills.

The Software Toolworks' typing tutor differs from others in that it uses glitzy two- and three-dimensional graphics, music and an arcade "road racer" game to keep the user interested. Traditional yawn-inducing drills and tedious typing repetitions are replaced by tidbits from, among other sources, the *Guinness Book of World Records.*

Mistakes are gently pointed out with conversational sentences as opposed to humiliating bleeps and bells. Guide hands type along with the user to illustrate technique — and also to point out Help windows for each stage of a lesson.

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- Help windows

Although Mavis likes to show students a good time, corporate MIS management should not dismiss the program as idle entertainment, users said. Most corporations have a variety of workers, all the way up to senior management, who could benefit from improved microcomputer keyboard skills.

"I went out looking for a typing tutor that was educational but also fun, and this hit the spot," said Kathy McClimans, assistant vice-president and manager of The Community State Bank in Point Roberts, Wash.

At the bank, Mavis is teaching tellers how to improve typing skills and, at the same time, initiating those without micro experience into the PC environment, McClimans said.

"By using the program during slow periods, like Saturday mornings, tellers are learning how to increase their words-per-minute speed and accuracy and learn a little about MS-DOS commands as well," McClimans said.

The biggest advantage of Mavis is that a student can learn typing skills without having to

*Continued on page 50*

# American Indian tribe reserves Dac, Dbase and 1-2-3

BY ALAN J. RYAN
CW STAFF

SANTA YSABEL, Calif. — Samuel I. Brown has to drive 70 miles over mountain roads to buy computer equipment. A poor choice can mean a great deal of wasted time.

As a data technician, Brown oversees the computing equipment of the Santa Ysabel Band of Mission Indians, a reservation set on 15,000 acres here and one of 18 reservations located within San Diego County's borders.

Part of Brown's job is the selection of software packages to aid in tribe business. Key packages include Dac Easy Accounting from Dac Software, Inc.; 1-2-3 from Lotus Development Corp.; Dbase from Ashton-Tate Corp.; Wordstar 4.0 from Micropro International Corp.; and First Publisher for desktop publishing from Software Publishing Corp.

**Accounting obstacles**

Clearly one of the most important applications is accounting. That is where Dac and 1-2-3 step in. "There are some custom accounting packages for Indian tribes," Brown said, "but they cost about $5,000." The steep price has kept the Mission Indians away from customized software; they have chosen instead to use off-the-shelf accounting packages to keep tabs on the tribe's finances.

Handling accounting for the tribe differs dramatically from corporate accounting. "We have to show a zero balance at the end of the year," Brown said. The tribe is funded through government grants, but because the grants expire in different quarters, the bookkeeper must keep a watchful eye on all accounts at all times.

"We're running each grant program with a separate Dac subsystem," he continued. "We can run them independently, close them out individually, and by porting them over to Lotus 1-2-3, we can derive a balance sheet."

Currently, the tribe has eight grants running under Dac subdirectories.

In addition to handling the finances, the on-site computers are used to keep the Mission Indians' 950 members informed of the latest happenings. Using Wordstar and First Publisher, Brown's office publishes newsletters and flyers.

**Hookup sought**

To keep himself informed, Brown said, he hopes to buy a modem to link his computers with other Indian data bases across the country. Such a link, he said, would help keep the tribe updated on available grants for health care and other needs, and would make it easier to determine whether the tribe qualified for a particular grant.

A data base link would also be useful for keeping up with the U.S. Bureau for Indian Affairs and issues related to that office, such as Indian water rights.

Because of Santa Ysabel's remote location, most phone calls are toll calls, Brown said, so computer support can be expensive. "Luckily, I'm pretty well versed in computers. I do all the repairs and programming of Dbase and Lotus," he commented. The tribe currently has two Compaq Computer Corp. Deskpro computers and a custom-built IBM clone.

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# Must's Nomad turns memory mogul

BY ALAN ALPER
CW STAFF

NORWALK, Conn. — Must Software International recently released Version 2.0 of PC Nomad, an IBM Personal Computer-compatible implementation of its Nomad fourth-generation language and data base management system for IBM mainframes. The upgrade is said to overcome the memory management shortcomings of the original release.

As with the latest release of Nomad for the mainframe [CW, March 28], the microcomputer implementation supports cooperative processing and referential integrity, the company said. Must, which acquired Nomad from D&B Computing Services last summer, said approximately 1,800 PC Nomad copies have been sold since the product was released one year ago.

Version 2.0 was entirely rewritten to make the product more stable and to improve its memory management capabilities, noted Frank Fish, Must's executive vice-president. Still written in C, the new version employs a virtual memory concept to enable users to develop applications that require address space exceeding the 640K-byte barrier supported by Microsoft Corp.'s MS-DOS, he explained.

Don Weimann, staff systems analyst at Chevron Information Technology Co., said Release 2.0 is much faster and seems to have fewer bugs than the original version. "The memory management facility adapts so that if you are using extended memory — beyond 640K bytes — you still get excellent performance," Weimann said.

### Nomad's land

Chevron has developed two applications with PC Nomad, starting with Version 1.0 and recently segueing to the beta release of Version 2.0.

One application is virtually completed: It is an accounting reconciliation system that merges internal company data with supplier and customer information. All relevant data is merged on the micro and then uploaded to the mainframe where the data base resides, Weimann said.

Chevron has decided to leave the system, which handles 20,000 records a month, on the PC rather than move it to a mainframe.

"It now makes sense to leave this on the PC and upload the data to the mainframe rather than process it all on the mainframe," Weimann said.

### Speeding cycles

Nomad's cooperative processing facility allows users to develop applications that run concurrently on the PC and the mainframe with record-to-record communication. With cooperative processing, the mainframe is used to house large data bases while the PC handles data entry and editing, Fish explained.

"This allows users to reduce mainframe computing cycles by 65% to 75%," Fish claimed.

Referential integrity is provided through the rules stored in PC Nomad's integrated data dictionary. Rules stored in the repository ensure referential integrity by defining relationships between data elements in the tables and actions to be taken when elements are changed or deleted, Fish noted.

Must has also enhanced PC Nomad's windowing facilities. Version 2.0 supports textual windows, enabling developers to customize output windows. New options — Autopick and Autotab — provide single-command facilities for implementing first-character menu selections and field-to-field movement. Previously, these options required repetitive coding, the company said.

Currently available, PC Nomad Version 2.0 operates on IBM PC XT- or AT-class machines running MS-DOS 3.0 or IBM PC-DOS 3.0 or higher with at least 10M bytes of hard disk and 640K bytes of memory. Release 2.0's price remains at $795 for a single copy.



Actual unretouched screen image.

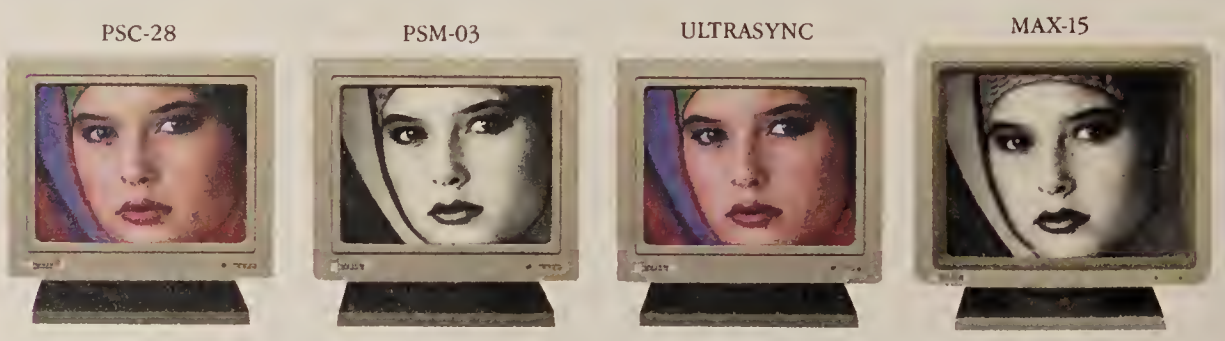

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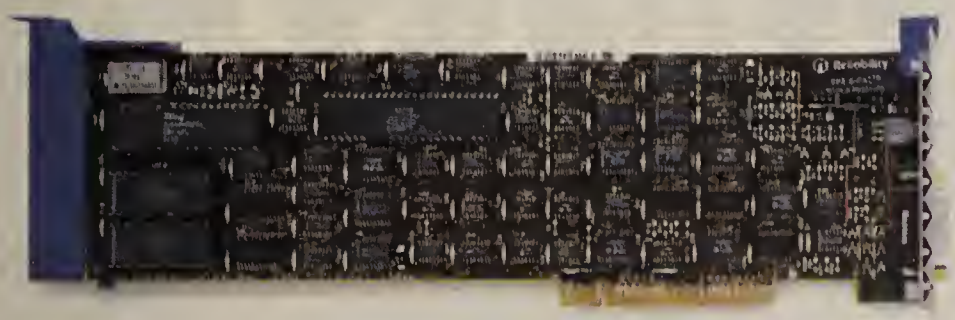
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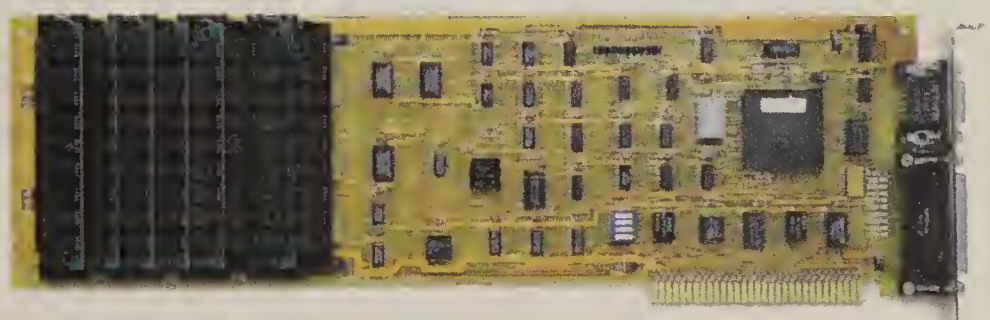
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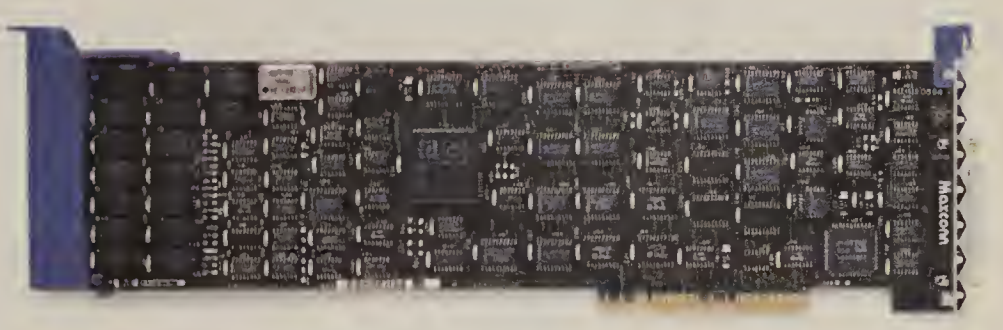
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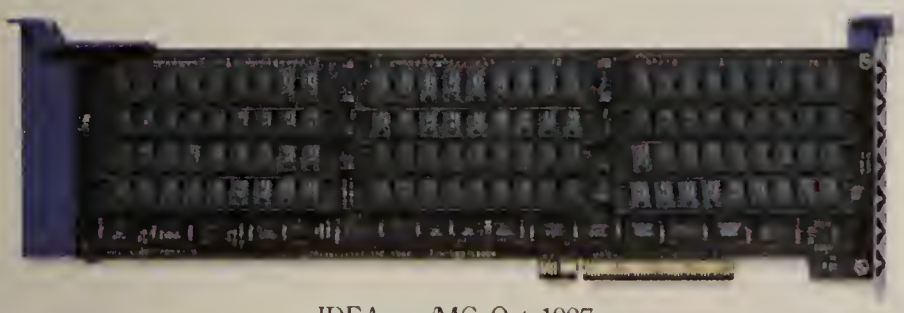
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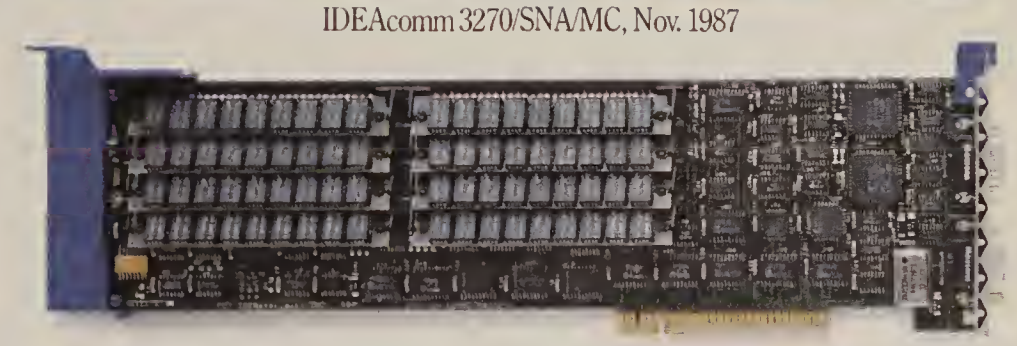
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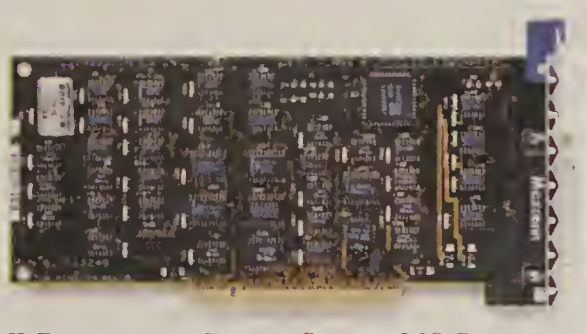
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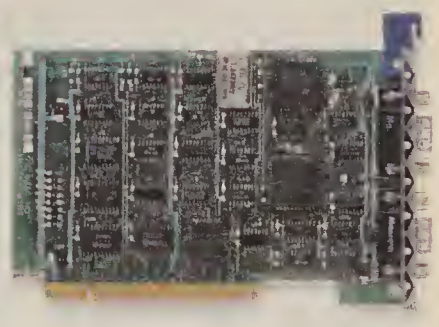
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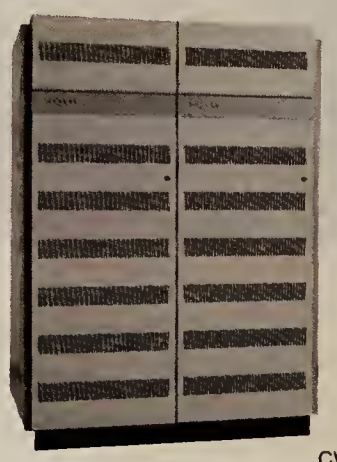
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SEQUOIA

# Barney

FROM PAGE 39

ing to T. A. Elkins, a disk caching expert and computer consultant, Borland 's Sidekick Plus, when used with disk caching software, can trash files on a hard disk. The problem is largely due to the disk caching software itself, which has tricky ways of dealing with the Lotus/Intel/Microsoft Expanded Memory Specification.

**Care for a rumor?** It has come to our attention that many micro software firms are doing what they should be — working hard on a bunch of new stuff. Wordperfect is said to be warding off competition by building electronic mail capabilities into its word processing software. Aldus, which rules the desktop publishing roost, is apparently looking to get a foothold in the growing market for presentation graphics.

**You can't be serious. OK, I'm not.** In past days, IBM was considered a staid blue giant. And getting information from the beast was like pulling teeth.

But with its new *glasnost* policy, IBM has not only changed its style but has moved its headquarters to Los Angeles.

To show off the new IBM, the firm invited a group of *Computerworld* writers to spend a day with IBM Chairman John Akers. Below are my recollections of the tumultuous day. But beware. As is often the case, I may have been sleeping.

The first thing I saw was Akers waltzing into the office mid-morning, sporting a tank top and two days' worth of stubble.

"Yo, Barn, you made it. Care for some alfalfa juice? It really grows on you."

"Gee, John, as a journalist, I usually don't drink liquids 'cept coffee till noon, but what the hey."

Grasping the frosty green beverage, I listened in on a conversation between Akers and Compaq Chairman Rod Canion. "OK, dude, here's the deal. We're going to have two new systems this month, both using the 386 but selling for less than our current 286 models. But don't worry — they won't be as fast as your new boxes. How's that sound, guy? Yeah, got to go. Hey, let's do the lunch thing, eh pal?"

Akers turned to me, grinning. "Ah, Doug, those wacky Texans. Him and Roach, man, they crack me up. They always talk with their mouths full of baby back ribs. And that high cholesterol slows their speech to a crawl."

Just then, Aker's distinguished secretary, Cooky, poked her head in. "Johnny, it's that Gates guy on Line 1. Should I tell him you're at aerobics again?"

Akers took the call. "Hey, Bill, you called on the party line. So where's the party?" Shifting from laughter to dead seriousness, Akers seemed to listen intently. After furrowing his brow, he responded.

"Sorry, Bill, but we need to go proprietary on the OS, 'cause, like, we need the dough. But listen: We'll give you the info to get you started on a work-alike for Rod and the guys, and we'll kick in a couple thousand cases of Jolt cola so you can get your stuff done on time. OK? Check you later."

I soon found myself staring at a group of well-dressed MIS directors in town to get the latest poop from IBM.

Akers briefed them quickly. "OK, we got the 4090, and the PS/2 Models 55, 70, 90 and 100.1 on the way. And we got Silverlake. But look, the DEC and HP minis and the Compaq desk-bangers work a lot better. Now, if you buy these babies from us, we'll cut you a great deal. Just put those IBM bumper stickers over those other guys' labels and put 'em to work."

Later events are little more than a fog. I vaguely remember an OS/2 disk-crashing party, a Micro Channel Swim and a Mac being dumped into a hot tub.

When I woke up in front of my terminal at work, Akers and the MIS guys were gone and there was no sign of Cooky. But there was a half-full glass of a thick, ugly green liquid.

---

Barney is a *Computerworld* senior editor, microcomputing.


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# Planning tool gets LAN upgrade

BY ALAN J. RYAN
CW STAFF

ONTARIO, Calif. — The proposal documentation for National Aeronautics and Space Administration projects is so large, it could fill a C-5 plane, which is larger than a Boeing 747.

Documentation weighing tons is common in the aerospace and defense industry because the U.S. government requires the proposals to be highly detailed, often asking that the work structure be described to the most minute levels.

Now, according to Micro-Frame Technologies, Inc., much of that volume can be eliminated. The company recently released a networked multiuser version of its MPM project planning software called MPM LAN, which is said to allow companies to move major management programs off mainframe computers and into the less expensive microcomputer environment. Instead of filling a C-5, documentation can now be stored on disks.

The software package reportedly helps in the preparation of proposals and the creation of monthly cost reports along with reports for managers and engineers.

MPM LAN is said to support up to 100 simultaneous users on PC-based workstations, supplying them with a mirror image of the single-user project management capabilities of MPM software.

"We're going to be using MPM LAN as a complete project manager to do scheduling, estimating, performance measurement and reporting," said John Kocon, supervisor of MIS engineering at The Garrett Corp. in Tucson, Ariz. Garrett was used as a beta site for MPM LAN and has been working with the single-user version since last July.

MPM incorporates a Work Breakdown Structure (WBS), rather than the Critical Path Method and networking systems common to other planning software, according to John O'Neil, president and chief executive officer at Micro-Frame.

The WBS is a tree-like data organization hierarchy resembling an organizational chart that handles proposal pricing, reporting of cost and schedule performance and project scheduling.

According to O'Neil, the aerospace and defense markets are larger than they may appear. He said that 8% to 10% of the nation's gross national product is spent on aerospace and defense and that there are in excess of 30,000 companies working in those industries.

### Scheduling is critical

"Companies can lose contracts if the documents aren't ready on time," O'Neil said, "but there are often a lot of oversights when contracts are completed too quickly." Because of that, the program incorporates criteria to verify that the numbers from the management system are accurate.

Kocon said his company evaluated project management software about nine months ago, including mainframe and microcomputer-based systems.

"We looked at some of the larger mainframe packages. . . . A lot of them focus on a specific project management concept," Kocon said. "What we found from Micro-Frame was very good estimating and very good performance, and their scheduling system met our minimum requirements. But their proposed [scheduling] enhancements would meet our needs exactly."

Kocon estimated that his company has saved between $100,000 and $150,000 in software costs alone compared with mainframe applications. "Additionally, many of the mainframe packages did not meet our requirements and would have required some customization," he said.

"The functional capabilities of this package exceed mainframe packages that run [from] $300,000 to $400,000," said Larry Brewer, group-earned value manager at the Government Electronics Group of Motorola, Inc. in Scottsdale, Ariz. "Nothing ever fits my exact requirements to a T," he said, "but Micro-Frame fits about 75% of my expectations. Some of the mainframe packages fit only 35% to 40%, and other PC packages fall only in the 15% to 20% range."


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# Tutor

CONTINUED FROM PAGE 41

leave the office, users said.

"We ordered the program for someone who doesn't know how to type — a development officer, in fact," said Carol Nottingham, office manager at the Smithsonian Institution's Department of Membership and Development in Washington, D.C. "The officer was able to stay in the office and work on the program when it was convenient, and not be away from the desk and miss calls."

At ITT Corp. subsidiary ITT Gilfillan in Van Nuys, Calif., Mavis was called in to help mid-level managers cope with the loss of their secretaries.

"We recently had some budgetary problems that called for cutbacks on secretarial help," said Matthew Gastaldo, an information center specialist. "Managers and supervisors had to start typing up their own memos on a PC, and most of them had to have their skills enhanced."

Programs like Mavis are becoming popular in corporate America because they address a fundamental problem and teach the skills needed to solve that problem, users and analysts said.

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# Micrografx

CONTINUED FROM PAGE 39

text through a separate window.

"With Illustrator and other Mac programs, you are always toggling in and out of Preview mode," Grayson said. "There is no Preview mode in Designer. You are always working in a mode where the final output is going to look like what you see on screen."

Designer lets users create 16 million colors and load and save customized color palettes. Users can customize their own color palettes or use color models such as Pantone PMS, a spokesman said. Designer 1.2 is being shipped with CMYK, RGB and HLS color models, as well as the Crayola Crayon color palette. Pantone PMS color support is optional and has a suggested retail price of $99.95.

The program has a new Microsoft Corp. Windows-compatible Postscript driver that improves printer output and supports color printers. It can also save the print file from any Windows application as an Encapsulated Postscript file.

**Boosts compatibility**

Support of Encapsulated Postscript improves the compatibility of Designer files with page-composition programs such as Xerox Corp.'s Ventura Publisher. Encapsulated Postscript is supported by most popular programs in both the Macintosh and the PC-compatible worlds.

Images created with Designer files are compatible with Aldus's PC Pagemaker, Micrografx's Graph Plus and Windows Draw. Charts from Graph Plus and drawings from Windows Draw can be opened in Designer. Designer supports all I/O devices supported by Windows, including the most popular graphics cards and displays, mice, laser and dot matrix printers.

Hardware requirements for the package include an IBM PC- or Intel Corp. 80386-compatible system with 640K bytes of memory and a hard disk, an IBM Enhanced Graphics Adapter or Video Graphics Array card, a graphics monitor, a mouse and a printer.

Registered users can upgrade to Designer 1.2 for $99. Those purchasing Designer after May 1 get upgrades free of charge. Version 1.2 costs $695.

# Pitta

CONTINUED FROM PAGE 41

ment and a number of different places."

When the Next system finally gets to market, it is expected to compete with Apple's Macintosh II, which added Unix in January. Jobs will likely relish competing with Apple. However, industry watchers say they believe that Next, although better known than the average start-up because of its colorful founder, will have a rough time competing with $2 billion Apple.

"Initially, I don't expect Next to have a tremendous impact on Apple," Dataquest's Lempesis maintains. "Although Steve Jobs is running it, Next is still a start-up, while Apple's a very large computer company." It will take time for Next to establish a marketing force, he adds, and the company's size will make it difficult to compete on price.

Apple won't be the only force that Next will contend with. It must also compete with formidable Sun Microsystems.

"I think it's going to be very difficult," says Esther Dyson, editor of the "Release 1.0" newsletter. "Steve is obviously going to go on everyone's short list, but he won't have the economies of scale that Apple and Sun will have."

**More from Apple.** At the recent Apple software developers' conference, Hypercard creator Bill Atkinson said a new version of the "personal tool kit" for the Mac will support compact disk/read-only memory. No launch date has been set, but sources said Hypercard 2.0 should be released shortly.

Introduced amid much hoopla last August, Hypercard didn't make the splash Apple had expected. An estimated 1,600 third-party developers attended the conference, up from 800 last year. Sources say Apple is adding about 200 certified developers each month.

Pitta is *Computerworld*'s West Coast senior correspondent.

# Symantec Time Line extended

CUPERTINO, Calif. — Symantec Corp. wedged its Time Line personal computer project management software into the world of mini and mainframe computers recently, announcing a plan to link Time Line with high-end products from Metier Management Systems.

Symantec and Metier teamed up to develop hooks between Time Line and Metier's Artemis project management software that allow users of either product to share data.

Time Line 3.0 users can transfer data to and from Artemis software by running a utility add-in disk with Time Line that Symantec will ship as a free upgrade during the second quarter. Metier is currently shipping Artemis Project, which can import and export data from Time Line and starts at $3,500.

The link to Artemis gives Time Line PC users a connection to project management software running on high-end workstations, Digital Equipment Corp. VAXs, Hewlett-Packard Co. 1000 series minicomputers and IBM mainframes.


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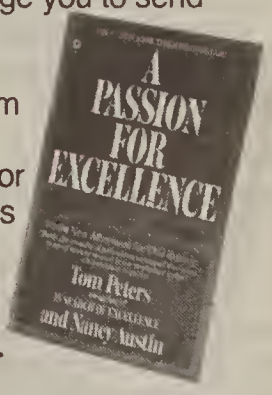
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# King

FROM PAGE 41

cilities so people can add things. Tying them all together and allowing them to be extended is the systems part of the application environment we are trying to produce.

**What do you need to do in terms of discipline?**
There are small steps we need to take in terms of improving the process. We are developing a mechanism right now that we are getting the developers to buy into. We want to have individual people — typically two-person teams, a marketing and a development person — responsible for certain things across all of our products.

For example, we may have a czar for bug tracking who will work across all development groups, ensuring uniformity and focusing on inconsistencies. Those are things we need to do, and we are doing them. And these ideas are coming from the developers.

A big slice of my time is working with developers. We have a lunch program where every day, 10 of us sit in a room and talk for two hours. I am doing that across the whole organization so that everybody tells me what they want me to do and tells me what the problems are. Out of that process, the tunings of the development process are under way.

**How is software developed at Lotus, and how large is the development infrastructure?**
There are two development modes. One is for brand-new programs that are embryonic. With these, a few people design a prototype and show it to their peers — a sort of skunk works.

The other mode is for programs like Release 3. Those kinds of programs require more structure; they tend to have larger teams — a formal development team, a formal documentation team, a formal QA team and a marketing team driving the function design decisions. The teams here tend to be smaller to do a piece of work than I have seen at IBM, but the structure is essentially the same.

**Do you foresee major structural or organizational changes?**
The development process is very healthy. We just have to leverage the changes we are making, mainly in the area of consistency across the set of development environments. It is extensions, not major changes.

**Does Lotus need more developers to crank out the promised products, or does it just need to be more efficient?**
I think it is highly efficient now.

**What are your thoughts on preannouncements?**
We need to move away from talking about futures. We need to tell our customers enough about what we are doing so they can plan. That is mandatory.

But I want to talk about products when we are ready to ship them or when we beta-release them.

**What happens when you talk too much about products that have not arrived?**
You get to participate in the vaporware lists.

**How do you develop products for platforms such as the OS/2 Presentation Manager, which is not yet stable?**
The initial part of the development process is writing a spec, so a lot of it is pure thought process. The tool you need is a good editor, not a code base. Now we do have Presentation Manager code and have been able to experiment with our ideas, but in the beginning, you are writing your spec.

**Are you at the coding point?**
Yes, and we have been showing the code to selected people.

**How long does it take to develop for the Presentation Manager, and can you get an early start with Windows?**
Knowing what Windows is and how applications exploit it helps the spec part. It is hard to do any software development in less than a year. The test process itself is four to five months minimum. A year is probably the lower bound.

**If an MIS director is thinking about the Presentation Manager and has to come up with a plan to implement it, what is the time frame if he wants to have a 1-2-3/G and Lotus/DBMS shop?**
I do not want to speculate on dates for our products. To get a feel for the industry, that is really an IBM and Microsoft question.

**Why?**
They, more than anyone else, have their finger on the pulse of who is doing what with the Presentation Manager. But there will be significant applications in early 1989.

**How much space will you leave in Release 3 for worksheets?**
As much as I can. It will be competitive and appropriate.

**What will Lotus's image be a year or two from now?**
I want us to continue to be known as developers and technical innovators.

# Borland revs Turbo Prolog, hopes to win programmers

BY STEPHEN JONES
CW STAFF

SCOTTS VALLEY, Calif. — Borland International set its sights on data base programmers recently with a new version of its Turbo Prolog application development tool that includes external data base support.

Turbo Prolog 2.0, which costs $149.95, features a data base system with development and maintenance tools for large data bases. By setting up its data bases in groups of chains, the program was designed to provide quick data sorting and retrieval. The package can also handle large data bases through its expanded memory support, according to Borland.

In addition, Turbo Prolog allows programmers to develop user interfaces, customized knowledge bases, expert systems, natural language interfaces and smart information systems.

> BORLAND claimed applications written in Turbo Prolog require one-tenth as many lines of code as those written with procedural tools.

Because it is a nonprocedural fifth-generation language, Borland claimed applications written in Turbo Prolog require one-tenth as many lines of code as those written with procedural tools.

With the code more compact, maintenance is easier, a Borland official said.

**Graphics cards read**
Turbo Prolog's interpreter can be modified to handle a different logic-programming language, inference engine, expert-system shell or program interface. Graphics support includes monochrome, IBM's Enhanced Graphics Adapter and Hercules Computer Technology, Inc. graphics cards, according to the venor.

The upgrade requires an IBM Personal Computer, PC XT, AT, Personal System /2 or compatible and 384K bytes of random-access memory, but Borland recommends 640K bytes.

The package runs with Microsoft Corp. MS-DOS and requires two floppy disks, although a hard disk is recommended.

# 1-2-3

FROM PAGE 39

All the above vendors pledged to port most existing add-ins to LEAF and to develop a new generation using the LEAF tools.

As a result, Release 3 users can look forward to a variety of add-ins, including printing utilities, data bases, word processing programs, compilers and graphics packages.

**LEAF structure**
Lotus took the opportunity to detail the LEAF language, which will debut shortly after the shipment of 1-2-3 Release 3 later this year.

According to Lotus, Release 3 and future Lotus applications will include the ability to use LEAF applications. To generate the applications, however, users must buy the $250 LEAF tool kit, which includes the language, code libraries, an editor, a compiler, a linker and a debugger.

Because Lotus will include LEAF support in a host of new products, LEAF applications will be portable to a variety of packages. LEAF support is planned for the Unix version of 1-2-3, but the company has not committed to LEAF support for 1-2-3/M, an IBM mainframe version of the ubiquitous spreadsheet.

**Back to Basic**
The Lotus approach with LEAF differs dramatically from that of Microsoft Corp., which plans to position Basic as a cross-applications macro and batch-file generator.

According to Microsoft, a key advantage of using Basic is that many users are already comfortable with the language. Lotus officials counter that LEAF, unlike Basic, is a high-level language optimized for the Lotus environment.

Some observers question whether Release 3 will leave add-in makers as much room for applications as Release 2, which left nearly 400K bytes of random-access memory for data or add-ins.

Release 3 is currently being shrunk to fit within the 640K-byte limit of Microsoft's MS-DOS, but it is not expected to be as small as Release 2, which has been noted for its compactness.

# Mitsubishi

FROM PAGE 39

"substantial free memory space." The obvious reason users have delayed buying laptops, according to Mitsubishi officials, is the poor quality of their displays. Mitsubishi said the MP286L's page-white, backlit, cold CRT screen will help overcome those reservations.

In addition to cold CRT, the new screen uses neutral twisted-pneumatic technology, which the firm said makes its LCD readable under any lighting.

The machine's base configuration, priced at $3,195, features dual 3½-in. 1.44M-byte disk drives. Users can also buy a version that has a 20M-byte hard disk drive. Both versions will run an external 5½-in. 1.2M-byte floppy disk drive and have one parallel and two serial ports.

Initially, the systems will be shipped with Mitsubishi's Color Graphics Controller, which supports both the built-in display and an external monochrome or color monitor. Support for IBM's Enhanced Graphics Adapter and Video Graphics Array is promised by the end of the year.

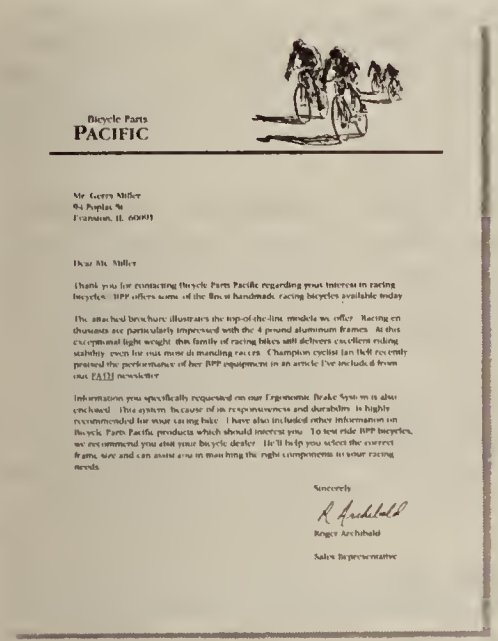
> MITSUBISHI OFFICIALS are calling the system a "desktop-laptop."

Mitsubishi officials are calling the system a "desktop-laptop" because it can be used as an office computer and can eventually be hooked up to local-area networks. The company is currently working on developing LAN cards, although a spokesman did not say when they would be available.

"There's a large universe of business professionals who have a need to use powerful computers in the home and office or even in a hotel room but have little desire to use them on airplanes or the field," said Jerry Grimson, Mitsubishi's vice-president of sales.

Options for the MP286L include an Intel 80287-8 math coprocessor, a built-in 2,400, 1,200 or 300 bit/sec. Hayes Microcomputer Products, Inc.-compatible modem card and a 17-key keypad. The 12- by 14- by 3½-in. system also features a real-time clock and a battery backup. Evaluation units of the MP286L are available immediately, although full production units will not be available until July, according to the company.

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Evanston, IL 60001

Dear Mr. Miller

Thank you for contacting Bicycle Parts Pacific regarding your interest in racing bicycles. BPP offers some of the finest handmade racing bicycles available today.

The attached brochure illustrates the top-of-the-line models we offer. Racing enthusiasts are particularly impressed with the 4 pound aluminum frames. At this exceptional light weight this family of racing bikes still delivers excellent riding stability, even for our most demanding racers. Champion cyclist Jan Bell recently praised the performance of her BPP equipment in an article I've included from our PATH newsletter.

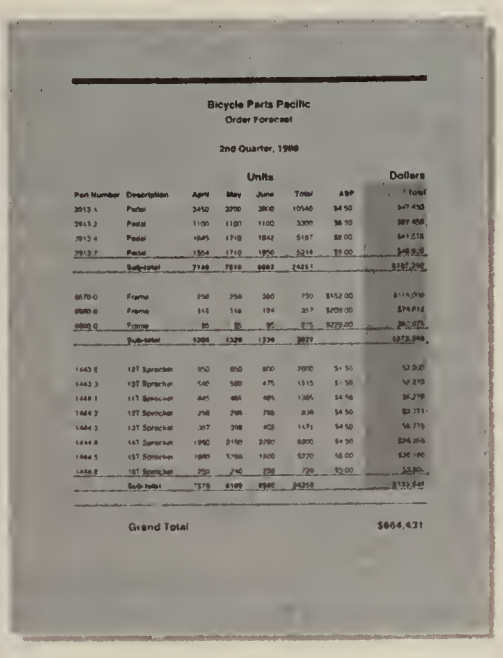
Information you specifically requested on our Ergonomic Brake System is also enclosed. This system, because of its responsiveness and durability, is highly recommended for most racing bike. I have also included other information on Bicycle Parts Pacific products which should interest you. To test ride BPP bicycles, we recommend you visit your bicycle dealer. He'll help you select the correct frame size and can assist you in matching the right components to your racing needs.

Sincerely

R. Archibald

Roger Archibald

Sales Representative

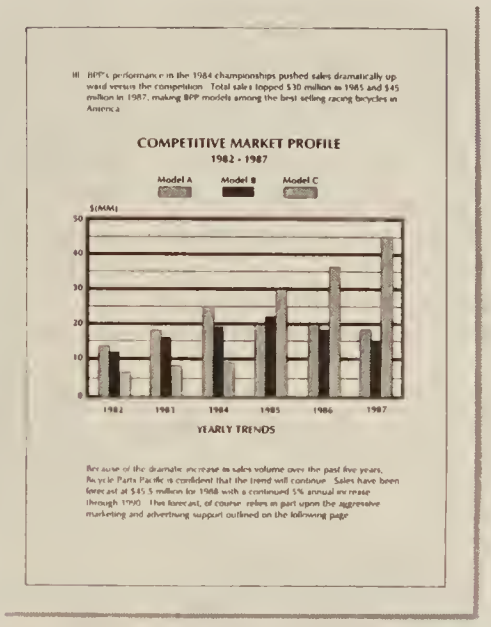


Bicycle Parts Pacific
Order Forecast

2nd Quarter, 1988

| | | Units | | | | | Dollars |
|---|---|---|---|---|---|---|---|
| Part Number | Description | April | May | June | Total | ASP | Total |
| 2013 x | Pedal | 3450 | 3700 | 3800 | 10940 | $4.50 | $49,230 |
| 2013 3 | Pedal | 1100 | 1100 | 1100 | 3300 | $8.50 | $28,050 |
| 2013 4 | Pedal | 1645 | 1718 | 1842 | 5187 | $8.00 | $41,496 |
| 2013 7 | Pedal | 1304 | 1710 | 1956 | 5214 | $9.00 | $46,926 |
| | Sub-total | 7749 | 7810 | 8842 | 24451 | | $167,702 |
| 8670 0 | Frame | 258 | 259 | 260 | 750 | $452.00 | $113,000 |
| 8680 0 | Frame | 145 | 146 | 194 | 257 | $709.00 | $182,213 |
| 8690 0 | Frame | 85 | 85 | 85 | 255 | $279.00 | $71,145 |
| | Sub-total | 3288 | 3329 | 3379 | 9977 | | $3,873,880 |
| 1443 6 | 12T Sprocket | 950 | 850 | 850 | 2650 | $4.50 | $2,925 |
| 1443 3 | 13T Sprocket | 540 | 580 | 475 | 1595 | $4.50 | $2,378 |
| 1443 1 | 14T Sprocket | 645 | 484 | 484 | 1613 | $4.50 | $6,278 |
| 1444 2 | 15T Sprocket | 298 | 298 | 298 | 838 | $4.50 | $3,771 |
| 1444 3 | 16T Sprocket | 367 | 398 | 458 | 1471 | $4.50 | $6,779 |
| 1444 4 | 17T Sprocket | 1960 | 3150 | 3290 | 8300 | $4.50 | $26,850 |
| 1444 5 | 18T Sprocket | 1980 | 1788 | 1600 | 5370 | $8.00 | $35,100 |
| 1444 6 | 19T Sprocket | 730 | 740 | 738 | 728 | $9.00 | $3,850 |
| | Sub-total | 7378 | 8109 | 8900 | 24259 | | $132,641 |

Grand Total $864,431



BPP's performance in the 1984 championships pushed sales dramatically upward versus the competition. Total sales topped $30 million in 1985 and $45 million in 1987, making BPP models among the best selling racing bicycles in America.

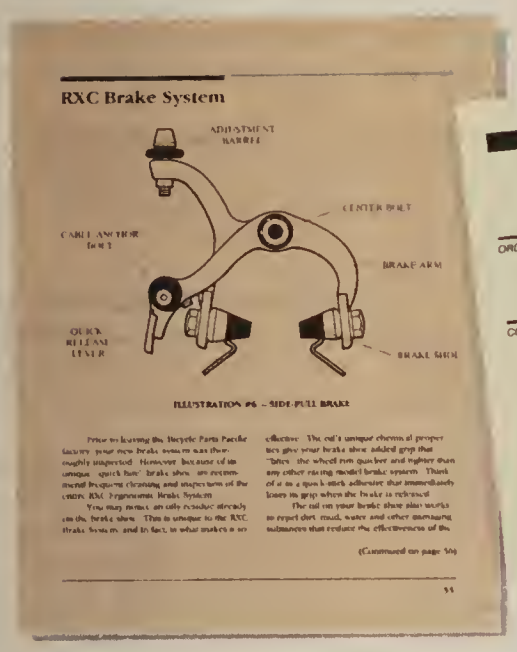
COMPETITIVE MARKET PROFILE
1982 - 1987

Model A Model B Model C




YEARLY TRENDS

Because of the dramatic increase in sales volume over the past five years, Bicycle Parts Pacific is confident that the trend will continue. Sales have been forecast at $45.5 million for 1988 with a continued 5% annual increase through 1990. This forecast, of course, relies in part upon the aggressive marketing and advertising support outlined on the following page.



RXC Brake System




ILLUSTRATION #6 – SIDE-PULL BRAKE

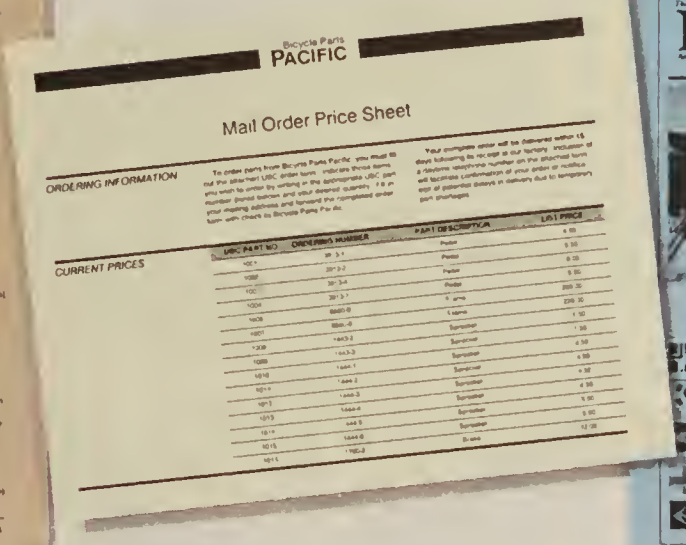
Prior to leaving the Bicycle Parts Pacific factory your new brake system was thoroughly inspected. However because of its unique "quick lure" brake shoe, we recommend frequent cleaning and inspection of the entire RXC Ergonomic Brake System.

You may notice an oily residue already on the brake shoe. This is unique to the RXC Brake System and in fact, is what makes it so effective. The oil's unique chemical properties give your brake shoe added grip that "takes" the wheel rim quicker and tighter than any other racing model brake system. Think of it as a quick attach adhesive that immediately loses its grip when the brake is released.

The oil on your brake shoe also works to repel dirt, mud, water and other damaging substances that reduce the effectiveness of the

(Continued on page 5b)





Bicycle Parts
PACIFIC

Mail Order Price Sheet

ORDERING INFORMATION

To order parts from Bicycle Parts Pacific, you must fill out the attached ORC order form. Indicate three items you wish to order by writing in the appropriate ORC part number (listed below) and your desired quantity. Fill in your mailing address and forward the completed order form with check to Bicycle Parts Pacific.

Your complete order will be delivered within 15 days following its receipt at our factory. Inclusion of a telephone number on the attached form will facilitate confirmation of your order or notification of potential delays in delivery due to temporary part shortages.

CURRENT PRICES

| ORC PART NO. | ORDERING NUMBER | PART DESCRIPTION | LIST PRICE |
|---|---|---|---|
| 1001 | 2013-1 | Pedal | $ 45 |
| 1002 | 2013-2 | Pedal | $ 85 |
| 1003 | 2013-3 | Pedal | $ 85 |
| 1004 | 2013-4 | Pedal | $ 85 |
| 1005 | 8680-0 | Frame | $ 425 |
| 1006 | 8690-0 | Frame | $ 275 |
| 1007 | 1443-2 | Sprocket | $ 45 |
| 1008 | 1443-3 | Sprocket | $ 45 |
| 1009 | 1444-1 | Sprocket | $ 45 |
| 1010 | 1444-2 | Sprocket | $ 45 |
| 1011 | 1444-3 | Sprocket | $ 45 |
| 1012 | 1444-4 | Sprocket | $ 45 |
| 1013 | 1444-5 | Sprocket | $ 45 |
| 1014 | 1444-6 | Sprocket | $ 45 |
| 1015 | 1492-3 | Brake | $ 125 |
| 1016 | | | |



The PATH

Racing Newsletter of Bicycle Parts Pacific



BRAKE SYSTEM PULLS OUT ALL STOPS AT BPP CLASSIC.

Top Cyclists Racing With The RXC.

| | |
|---|---|
| NORWAY | Rick Pellucci<br>Jim Lyons |
| SOUTH KOREA | Deerish McCullough<br>Doug Carnahan<br>Bill McLynn |
| AUSTRIA | Jan Bell<br>Arlene King<br>Debbie Hooven |
| FINLAND | Hannah North<br>Jori Peterson |
| BRAZIL | Cathy Lyons<br>Mike Miloch |

CYCLIST JAN BELL BRINGS HOME THE GOLD

Jan Bell, a two year veteran of Team BPP captured first place on Sunday at BPP Classic. The race sponsored in part by Bicycle Parts Pacific, took place on a grueling 26-mile course through the back roads of central Indiana. Jan crossed the finish line in 1:02:16 a career best and well ahead of favorite Arlene King, from Austria.

Jan, who was riding a BPP racing bike geared to the RXC Ergonomic Brake System as one of the determining factors in her successful race. She was faced with challenging hairpin curves and continuous rain throughout the entire race. The RXC "quick lure" brake shoe gave her "more confidence to reacting aggressively when needed" she said. "Quick refit we don't mean a thing if your equipment doesn't act accordingly" she added.

We congratulate Jan on her win. Once again, the RXC Racing Model Ergonomic Brake System has proved it's one tough competitor.

Bicycle Parts
PACIFIC

to finish.


*The HP LaserJet Series II Printer.*



Nothing brings your ideas to life like the HP LaserJet Series II Printer—from office memos to forms to newsletters. As the leading laser printer, it works with all popular PCs and PC software packages. And, with a wide range of fonts, you get more options to create superior looking documents.

With additional memory you can even print sophisticated 300 DPI full-page graphics. And with HP's ScanJet scanner, you can also easily add photographs, illustrations and text.

No wonder more people choose the original over all other laser printers combined.

So call 1 800 752-0900, Ext. 900D for your nearest HP dealer.

HEWLETT PACKARD

© Hewlett-Packard 1988

Print samples were created using Microsoft Word, Microsoft Excel, and Aldus PageMaker.

# NEW PRODUCTS

## Systems

**Epson America, Inc.** has enhanced **Equity II Plus**, its entry in the small-footprint IBM Personal Computer AT-compatible market. Equity II Plus now has an Intel Corp. 80286 microprocessor and switchable clock speeds of 8 and 12 MHz.

A 40M-byte hard disk is standard, and the system is bundled with Microsoft Corp.'s MS-DOS Version 3.03 operating system. It also includes six expansion slots and 640K bytes of random-access memory.

The enhanced Equity II Plus is priced starting at $1,899.

Epson America, 2780 Lomita Blvd., Torrance, Calif. 90505. 213-539-9140.

**Massachusetts Computer Corp.** (Masscomp) has announced several additions to its line of standards-based real-time computers for scientific and engineering applications.

The Unix-based **Masscomp 6000 family,** available in configurations ranging from seven-slot pedestals to 30-slot cabinets, uses a binary-compatible multiple-processor architecture based on the Motorola, Inc. MC68030 microprocessor. The four new systems reportedly perform up to 35 million Whetstone instructions per second.

The series can be configured with up to five MC68030-based CPUs, each with its own 64K-byte cache and floating-point processor.

Pricing for the Masscomp 6000 family ranges from $24,900 to $120,000.

Masscomp, One Technology Way, Westford, Mass. 01886. 800-451-1824.

**Valid Logic Systems** has announced **Realchip II**, the company's second-generation hardware modeling system.

Used with Valid Logic's electronic design automation systems, Realchip II supports the simulation of designs containing complex, very large-scale integration devices. The system allows any number of users on a design team to access the hardware modeler simultaneously. Realchip II can be accessed from any of Valid Logic's electronic design automation platforms, including the Digital Equipment Corp. Vaxstation and Sun Microsystems, Inc. workstations.

Realchip II costs $65,000.

Valid Logic, 2820 Orchard Pkwy., San Jose, Calif. 95134. 408-432-9400.

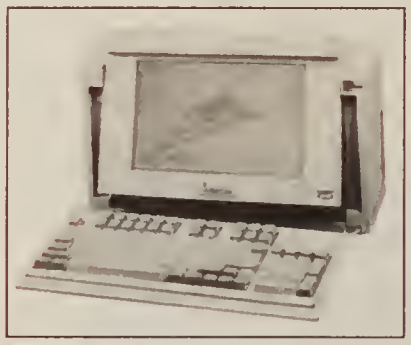
The **Rabbit 286**, a portable IBM Personal Computer AT compatible, has been announced by **Chicony America, Inc.**

The system comes with one or two 1.44M-byte 3½-in. floppy disk drives or one floppy and one 20M-byte 3½-in. hard disk drive. Ports are available for an external 5¼-in. disk and an IBM Monochrome Graphics Adapter and Color Graphics Adapter card.

Based on a one-wait state, 6- or 12-MHz Intel Corp. 80286 microprocessor, the system includes 1M byte of random-access memory, expandable to 4M bytes. The 640- by 400-pixel supertwist backlit LCD provides an 11-in. diagonal screen with 80 char. by 25 lines.

Prices range from $2,150 to $2,450, depending on configuration.

Chicony America, 1641 W. Collins Ave., Orange, Calif. 92667. 714-771-6151.



**Chicony's** *Rabbit 286*

## Software applications packages

**Symantec Corp.** has announced Version 1.01 of its **Q&A Write** word processing software.

The package includes layered menus, a 100,000-word spelling checker and soft-hyphenation support. It also offers font and laser printer support for as many as nine fonts per document, an advanced search-and-replace function, multicolumn printing and mail merge via an integrated 1,000-record card file. It can be fully integrated with Lotus Development Corp.'s 1-2-3.

Q&A Write costs $199. A thesaurus is available seperately for $49.95.

Symantec, 10201 Torre Ave., Cupertino, Calif. 95014. 408-253-9600.

A text-styling tool for Apple Computer, Inc's Macintosh is now being published by **Broderbund Software, Inc.**

The program, **Postermaker Plus,** allows desktop publishers to create logos, mastheads and other applications. The package can reportedly stretch, wrap, bend, reduce, expand or squeeze text. Shadows, shades and patterns may be added, and colors may be assigned when printing on an Apple Imagewriter II.

Users can import paint files and export paint, scaled paint and encapsulated Adobe Systems, Inc. Postscript files.

The package is priced at $59.95.

Broderbund, 17 Paul Drive, San Rafael, Calif. 94903. 415-492-3200.

**Reliable Software** has introduced **PC Keyrack**, a key inventory control and building security system. Through on-line reports, the system monitors key distribution to employees for access to buildings, lockers or equipment. A Vulnerable Facilities Report function allows managers to determine which facilities are vulnerable to theft or vandalism by monitoring employee keys that have been lost or stolen.

The program runs on the IBM Personal Computer, PC XT and compatible systems and requires 128K bytes of memory and a hard disk.

Keyrack costs $350.

Reliable Software, Suite 2, 3049 Doris Court, Lake Oswego, Ore. 97035. 503-635-3939.

**NBI, Inc.** has announced **Legend**, a document processing program that merges advanced word processing, desktop publishing and graphics capabilities.

Running on Microsoft Corp.'s MS-DOS 3.2 and using the Microsoft Windows interface, Legend offers a "what-you-see-is-what-you-get" environment.

The product accepts imported text, data and graphics files from ASCII, IBM's Display Information Facility and other formats, and product files can be exported in ASCII.

Legend supports the Adobe Systems, Inc. Postscript page description language and any scanner using Tagged Image File Format or Zsoft Corp.'s PC Paintbrush Format. The product also requires an Intel Corp. 80286 or 80386-based IBM Personal Computer or compatible, a minimum of 640K bytes and a 20M-byte hard drive.

Legend costs $695.

NBI, P.O. Box 9001, Boulder, Colo. 80301. 303-444-5710.

A personal computer-based mapping package was recently announced by **Mapping Information Systems Corp.**

**Mapinfo** is said to allow users to analyze information in existing data bases and display the results in a variety of map formats.

The software can automatically create pin maps that display points on the screen, depending on the street address, along with thematic maps, which highlight defined regions using color, shading, borders or other graphic devices.

Mapinfo runs on the IBM Personal Computer XT, PC AT and compatibles and requires 640K bytes of memory as well as a hard disk.

Mapinfo costs $750.

Mapping Information Systems, Hendrick Hudson Building, 200 Broadway, Troy, N.Y. 12180. 518-274-8673.

A package supporting simultaneous multiple document processing on personal computers has been introduced by **Turbosoft/Turbo Law Laboratories, Inc.**

**Overdrive for Wordperfect** automatically creates Wordperfect Corp.'s Wordperfect macros for printing multiple documents in one keystroke and includes a library manager for organizing up to 1,250 documents.

Written in C language, the package is compatible with all versions of Wordperfect 4.0 and higher and incorporates multiple integrated document assembly system, or Midas, technology.

Overdrive for Wordperfect costs $99.95.

Turbosoft/Turbo Law, Suite 101, 2135 112th Ave. N.E., Bellevue, Wash. 98004. 206-454-7675.

**Coddbarrett Associates, Inc.** has introduced **Bitfolio Special Edition**, a computer arts and symbols library designed for Lotus Development Corp.'s Freelance and Freelance Plus and Zenographic Co. users.

Each picture file is optimized for color-thermal printing or 35mm output and can be used with pen plotters. Categories include borders, backgrounds, business, common objects, communications, human forms, nature, sports and transportation.

Bitfolio Special Edition costs $250.

Coddbarrett Associates, 65 Ashburton St., Providence, R.I. 02904. 401-273-9898.

**E/Step Software, Inc.** has released the **Finished Goods Series**, a statistical forecasting and inventory management system that runs on Microsoft Corp. MS-DOS-compatible microcomputers.

Forecasting at multiple levels is supported with automatic distribution to higher or lower levels, and the inventory management module determines the safety stock levels required to achieve any desired customer service level. The system includes a user-customizable data base, an on-line screen forms generator and an ad hoc report writer.

The Finished Goods System costs $25,000, which includes installation, training, custom interfaces and consulting on specific forecasting needs.

E/Step Software, 12 Hill St., Hopkinton, Mass. 01748. 617-435-3043.

**Palladian Software, Inc.** has announced the **Operations Planner,** designed to assist industrial and manufacturing engineers in operational change analysis.

The software uses menus, windows and tables for data entry and model building and points out omissions and inconsistencies. Users may analyze the completed model to determine tradeoffs among capacity, utilization, product costs and lead times.

The product runs on the IBM Personal Computer, PC XT, AT or compatibles and requires 640K bytes of random-access memory and 2M bytes of free hard-disk space.

The Operations Planner costs $3,500 for a single license.

Palladian, Four Cambridge Center, Cambridge, Mass. 02142. 617-661-7171.

**Evolution Computing** has released **Easycad2** for the IBM Personal Computer, PC AT, Personal System/2 and compatibles along with Compaq Computer Corp.'s Compaq 386.

The product has associative pattern fill and allows line styles to be selected from dialogue boxes. Easycad2 allows 16 colors on 256 layers that can be hidden, shown or frozen independently. Bidirectional drawing exchange can be performed with Versacad Corp.'s Versacad and Fastcad. The product also has floating-point accuracy with near-infinite zoom.

Easycad2 costs $169.95.

Evolution Computing, 437 S. 48th St., Tempe, Ariz. 85281. 602-967-8633.

**Software Publishing Corp.** has announced **Professional Write 2.0,** an enhanced version of its managerial word processing program.

The package offers direct connections to secretarial word processing, data base and spreadsheet programs and support for multiple fonts. It includes file management capabilities and requires 512K bytes of random-access memory, Microsoft Corp. MS-DOS 2.0 or higher and a dual-drive IBM Personal Computer, PC XT, AT, Personal System/2 or compatible system. A hard disk is recommended when using fonts.

Professional Write 2.0 costs $199.

Software Publishing, 1901 Landings Drive, Mountain View, Calif. 94093. 415-962-8910.

A real-time multiuser accounting package has been introduced by **Champion Business Systems, Inc.**

A module of Champion III, the **Multi-User Module** permits one or more users to access and process information in the same file, with data protection in the event of a crash.

Champion III is written in Ashton-Tate Corp.'s Dbase III. Single- and multiuser versions require an IBM Personal Computer or compatible, a hard disk and a minimum of 640K bytes of random-access memory.

The Multi-User Module costs $695.

Champion Business Systems, P.O. Box 4008, Golden, Colo. 80401. 800-243-2626.

# If you can see the difference, you must be looking at the price.

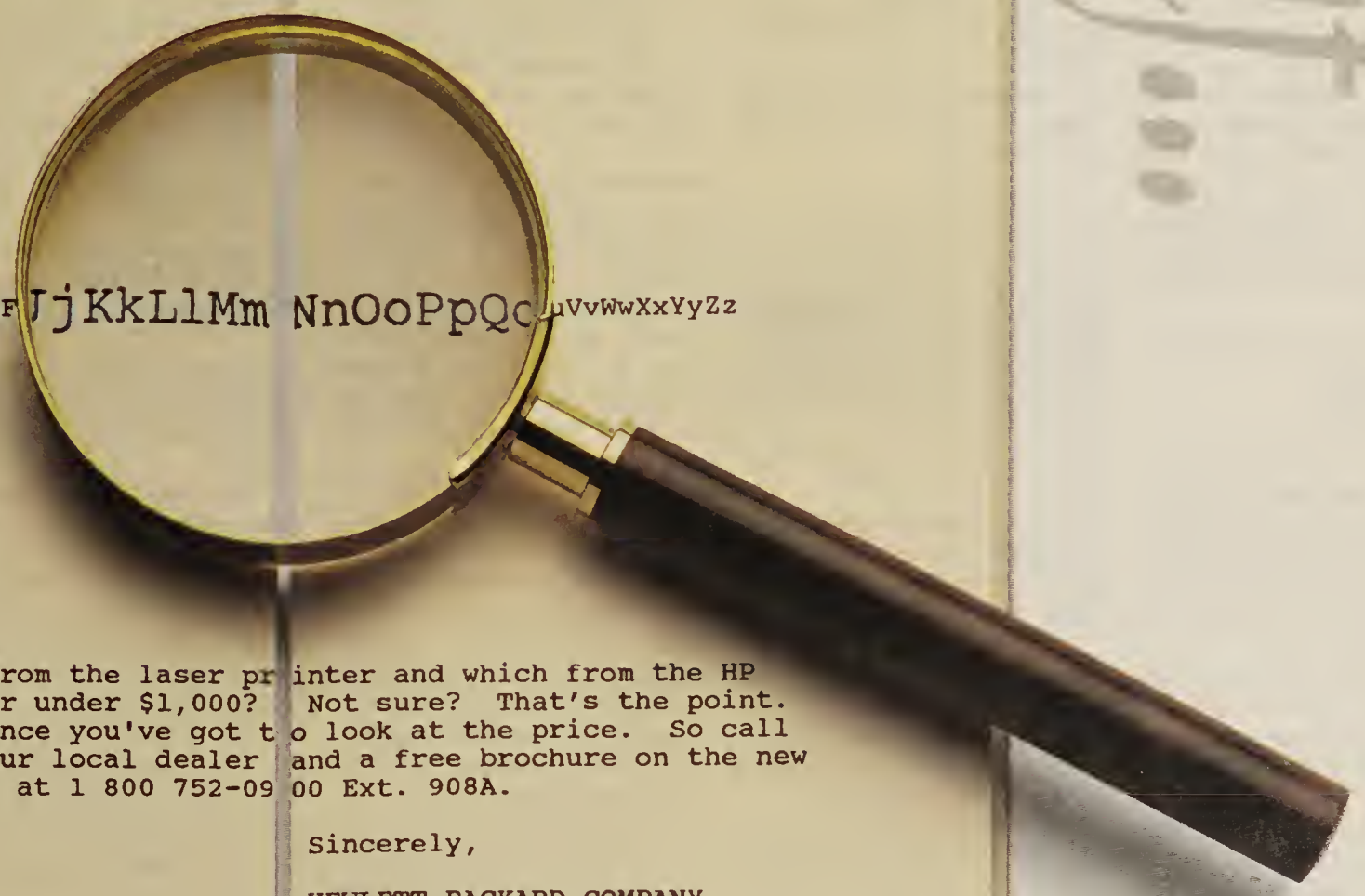
we never stop asking "What if...?"

Hewlett-Packard Company
18110 S.E. 34th Street
Camas, WA 98607

Dear Reader:

This letter was printed on two of the finest printers available today. One half on a laser printer, the other on the new HP DeskJet Printer. But which one printed which half? Hard to tell, isn't it?

Small and quiet enough for your own desk, our HP DeskJet Printer gives you clean, crisp text and graphics. Just like a laser. You get perfect printing from A to Z. Look for yourself.




So which half is from the laser printer and which from the HP DeskJet Printer for under $1,000? Not sure? That's the point. To see the difference you've got to look at the price. So call for the name of your local dealer and a free brochure on the new HP DeskJet Printer at 1 800 752-0900 Ext. 908A.

Sincerely,

HEWLETT-PACKARD COMPANY

Greg Wallace
Greg Wallace

Laser Printer

HP DeskJet Printer

*The New HP DeskJet Printer. Laser-Quality Output for Under $1000.*



HEWLETT PACKARD

© Hewlett-Packard Co. 1987

A graphics package for IBM Personal Computers and compatibles has been introduced by **Systonetics, Inc.**

**Visionmicro Graphics** is an add-on module for the company's project management software that allows users to design their own network.

The module offers plots of Gantt Bars, X and Y charts and networks and is recommended for use with Hewlett-Packard Co. or Zeta Industrial Co. plotters.

The Visionmicro Graphics System costs $995.

Systonetics, 1561 E. Orangethorpe Ave., Fullerton, Calif. 92631. 714-680-0910.

A sales support software package, **The Maximizer**, has been introduced by **Pinetree Software Canada, Ltd.**

Designed for use on IBM and compatible desktop, portable and laptop computers, the product is menu-driven and provides multiple levels of help and overlay windows. Using seven interlinked segments, the package assists sales staffs in lead generation, account development and account management.

The Maximizer costs $495 per package.

Pinetree Software Canada, 9th Floor, 8100 Granville Ave., Richmond, B.C. V6Y 1P3. 800-663-0375.

## Software languages

**DCM Data Products** has announced **Mactran Plus Version 3.0,** an integrated Fortran development system for the Apple Computer, Inc. Macintosh 512E, Mac Plus, Mac SE and Macintosh II.

The product includes a text editor, a native code compiler with optional in-line code generation and an on-line system debugger. Mactran Plus has optimized code generation, generation of stand-alone applications and double-precision real and complex numbers.

Mactran Plus Version 3.0 costs $399.

DCM Data Products, 1710 Two Tandy Center, Fort Worth, Texas 76102. 817-870-2202.

## Data storage

A 5¼-in. write-once read-many (WORM) disk drive for the Apple Computer, Inc. Macintosh series and IBM Personal Computers and compatibles is available from **Panasonic Industrial Co.**

The **LF-5000** WORM drive with small computer systems interface offers removable write-once cartridges with a capability of up to 200M bytes of storage. Data transfer rate is 2.5M bit/sec. from the optical media to the active memory.

The unit reportedly has a media life of 10 years and measures 8⅛ in. wide by about 5 in. high by 15⅛ in. long.

The LF-5000 costs $2,595.

Panasonic, Two Panasonic Way, Secaucus, N.J. 07094. 201-348-7000.

With the announcement of application software for its optical memory disk recorder and disk player, **Panasonic Industrial Co.** now offers an optical disk turnkey system.

The **TQ-2026F Disc Recorder** and the **TQ-2027F Optical Disc Player,** coupled with the visual data base application software, are part of a complete desktop system.

The TQ-2026F, a laser-based optical FM recording and playback system, can record up to 24,000 still picture frames or 13 minutes and 20 seconds of full-motion video on a single videodisk. The TQ-2027F was designed for specialized videodisk applications such as training and education, point-of-purchase sales and computer graphics systems.

The TQ-2026F costs $14,995. The TQ-2027F costs $3,995.

Panasonic, Two Panasonic Way, Secaucus, N.J. 07094. 201-348-7000.



**Panasonic's** *TQ-2026F*

**Storage Dimensions** has introduced a high-capacity disk-drive subsystem available for IBM Personal Computers and PC ATs with standard modified frequency modulation hard-disk controllers.

Called **Speedstor AT160,** the subsystem has a storage capacity of 159M bytes.

Speedstor AT160 runs with the industry-standard WD1003 series and compatible modified frequency modulation controllers supplied with most Intel Corp. 80286 and 80386 computers, and it supports DOS Versions 2.1 through 3.3.

The Speedstor AT160 Hard Disk Subsystem costs $2,620.

Storage Dimensions, 981 University Ave., Los Gatos, Calif. 95030. 408-395-2688.

The **IB40F**, a high-capacity hard-disk card, has been announced by **Origo International.** The IB40F is Intel Corp. 80286 compatible, uses an ST412/506 interface and operates in both eight- and 16-bit slots.

The card has a capacity of 40M bytes and an average access time of 40 msec. Using four disks, it rotates at 3,600 rpm, with six data heads recording on eight surfaces. The disks employ 17 sectors per track on 615 cylinders with a transfer rate of 5M bit/sec.

The IB40F is priced at $769.

Origo International, 20675 Bahama St., Chatsworth, Calif. 91311. 818-340-7552.

## Printers/Plotters/Peripherals

A series of dot matrix printers is now available from **Alps America.**

The **Allegro 24** has a 180 by 360 dot/in. resolution, and the 24-pin printer drafts at 180 char./sec.

A nine-pin model, the **ASP1000**, drafts at 120 char./sec. in 10-pitch mode and offers front-panel controls, according to the vendor. Each has a straight paper path for routing paper directly from the tractor to the print head.

The flatbed printers come bundled with Alpsmate, a random-access memory-resident software utility program with pop-up menus.

The Allegro 24 costs $499.

The ASP1000 costs $299.

Alps America, 3553 N. First St., San Jose, Calif. 95134. 408-432-6000.

**Microvitec, Inc.** has introduced a 19-in. Apple Computer, Inc. Macintosh II compatible monitor.

**Auto-Sync**, a variable-frequency monitor, offers Macintosh II, Commodore Business Machines, Inc. Amiga and IBM Personal System/2 compatibility.

The product has a 1,024- by 768-pixel resolution interlaced or a 800- by 600-pixel resolution noninterlaced and supports color and enhanced graphics adapter standards. Auto-Sync was designed for desktop publishing, computer-aided design and manufacturing, industrial control systems and presentation graphics environments.

Auto-Sync costs $2,395.

Microvitec, Airport Perimeter Business Center, 1943 Providence Court, College Park, Ga. 30337. 404-991-2246.

A product that transforms Epson America, Inc. dot matrix printers into image scanners has been introduced by **Computer Aided Technology, Inc.**

Called the **Cat Image Scanner**, the product has dual scanning modes: a line art mode for technical drawing, logos, cartoons and graphs and a halftone mode for photographs.

The Cat Image Scanner provides 128 gray levels with contrast control, 300 by 261 dot/in. resolution and conversion capabilities for PCX, TIFF and PFF output formats.

The Cat Image Scanner costs $195.00

Computer Aided Technology, Suite 212, 7411 Hines Place, Dallas, Texas 75235. 214-631-6688.

**Micro Display Systems, Inc.** has extended its Genius product line with the introduction of a 15-in. monochrome display monitor for the IBM Personal System/2 Models 50, 60 and 80.

The **Genius MC** has a noninterlaced, black-on-white reverse video image with 736- by 1,008-pixel resolution at 100 dot/in.

The monitor incorporates gate array semiconductor technology and is said to provide 50% faster screen drawing than the current controller board for the Genius.

The Genius MC costs $1,995.

Micro Display Systems, 1310 Vermillion St., Hastings, Minn. 55033. 612-437-2233.

**GTCO Corp.** has introduced the **GT Mouse** for the IBM Personal Computer, PC XT, AT and compatibles.

The three-button mouse requires no pad or external power supply and has multiple bit per second rate settings to fit all applications. The product comes with a diskette containing both testing and demonstration programs.

The GT Mouse costs $109.

GTCO, 7125 Riverwood Drive, Columbia, Md. 21046. 301-381-6688.

## Board-level devices

A graphics board for Apple Computer, Inc.'s Macintosh II has been announced by **Rasterops Corp.**

The **Colorboard 100** comes with National Television System Committee and Phase Alternating Line capabilities, allowing users to output graphic images from a Macintosh II personal computer onto a television or a videocassette tape.

The product has 1,024- by 768-pixel resolution with a pixel frequency of 64 MHz. A 15- or 19-in. monitor may be used for full-page display.

The Colorboard 100 costs $1,495.

Rasterops, 10161 Bubb Road, Cupertino, Calif. 95014. 408-446-4090.

An IBM Micro Channel architecture memory board for Microsoft Corp. MS OS/2 and MS-DOS applications has been announced by **Boca Research, Inc.** The **Bocaram 50/60** board for IBM Personal System/2s offers up to 4M bytes of memory per board and dual in-line package chip technology.

A menu-driven installation program and a diagnostics package are included, and the board comes with a two-year warranty.

The Bocaram 50/60 costs from $645 to $1,695, depending on memory configuration.

Boca Research, 6401 Congress Ave., Boca Raton, Fla. 33487. 305-997-6227.

**Imaging Technology, Inc.** has introduced a real-time modular image processor for the IBM Personal System/2.

The **Series 151** enables users to perform image processing on the IBM Micro Channel bus and comes in a chassis with seven or 12 board slots. The product captures images from both RS-170 and nonstandard video



**The** *Series 151 processor*

sensors, including line and area-scan cameras. Capabilities include real-time averaging, subtraction and convolutions.

The base configuration of the Series 151 is $11,495.

Imaging Technology, 600 W. Cummings Park, Woburn, Mass. 01801. 617-938-8444.

**Orchid Technology** has introduced two multifunction boards for the IBM Personal System/2.

**Ramquest Extra** provides up to 8M bytes of memory for the PS/2 Models 50, 60 and 80. It offers two serial ports, and the user can install up to four boards, totaling 32M bytes of memory. Designed for word processing and spreadsheet applications, **Ramquest II** is available with 1M or 2M bytes of memory.

Ramquest Extra with 1M byte of memory costs $1,199. Ramquest II costs $849.

Orchid Technology, 45365 Northport Loop W., Fremont, Calif. 94538. 415-683-0300.

## Auxiliary equipment

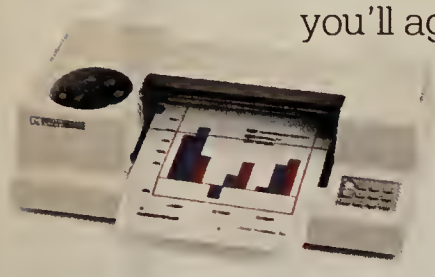
A power control center for the Macintosh II is available from **Kensington Microware, Ltd.** Called **Master Piece Mac II,** the product organizes system power with a continuously powered computer outlet and four peripheral outlets with individual and master switching.

Modem protection is provided through two RJ11 modular phone jacks located on the back of Master Piece Mac II, preventing electrical disturbances on the telephone line from interfering with modem activity.

Master Piece Mac II costs $159.95.

Kensington Microware, 251 Park Ave. S., New York, N.Y. 10010. 800-535-4242.

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| Most Frequently Recommended System | *1 | [illegible] | 4 | 2 |
| Training | 1 | 4 | 3 | 2 |
| Documentation | 1 | 4 | 2 | 3 |
| Attendant Operations | 1 | 4 | 3 | 2 |
| Installation/Cutover | 1 | 2 | 3 | 4 |
| System Management | 1 | [illegible] | [illegible] | 3 |
| User Operation | •1 | • | [illegible] | 2 |
| Hardware Reliability | 1 | [illegible] | 3 | 4 |
| Maintenance/Service | 2 | 3 | 1 | 4 |
| Troubleshooting | 1 | 2 | [illegible] | [illegible] |
| Systems Performed as Expected | 1 | 4 | [illegible] | [illegible] |

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Cover illustration:
"Avenues for the PC Purchase"
Julia Talcott

# LET'S MAKE A DEAL: STRETCHING YOUR PC DOLLAR

*BY JAMES A. MARTIN*




KATE BRENNAN HALL

When it comes to negotiating a microcomputer hardware purchase, the old axiom "knowledge is power" certainly holds true.

The most effective resource available to a corporation or business for securing a sweetheart deal with a personal computer supplier, users say, is an understanding of the microcomputer market in general and the supplier's competition in particular.

Although pricing is a crucial issue in negotiations, being well versed in a variety of other topics — support, product life span, a supplier's fiscal strength and market share — can often help a company maneuver the best deal on the bottom line.

"You need to know what kind of customer you are to the retailer or manufacturer," advises Kevin Farrell, manager of microcomputing and management services at Firestone Tire & Rubber Co. in Chicago. "Have a sense of the volume you purchased last year, especially if you are a large customer. Refresh their memory as to any problems that may have occurred in previous years."

Be aware that the other party will be prepared to negotiate for its best interests, Farrell adds. "The dealer will try to add value in a way that will reduce your discount, such as offering on-site maintenance or some other creative marketing proposal," he says. "Some of these suggestions might be good, but it's important to remember that, as the customer, you are on the better end of the deal."

Most users agree that competitive price bids from a variety of vendors is the best ammunition for negotiating. But the ultimate goal, they say, should be to use that information to weed out all but the most qualified vendor and then develop a solid relationship with that vendor.

At Continental Illinois National Bank & Trust Co. of Chicago, for example, the micro purchasing philosophy is to send out requests for proposals to every major IBM and Compaq Computer Corp. dealer each year, invite all interested dealers to one meeting and say, "May the best man win."

"We make it clear in a gentleman's agreement that the vendor we pick will get our business for the next year," says Jim Ross, systems officer at the bank. "After some supply shortage problems last year, we will go with two different dealers from now on."

The bank plans to start off ordering evenly between the two and after a couple of months make one company the primary supplier and the other the secondary supplier, basing the

*Continued on page SR/4*

Martin is a *Computerworld* West Coast correspondent.

# Deal

FROM PAGE SR/3

choice on service and price.

Continental believes in maintaining close ties with its PC suppliers. For example, the dealer is networked with Continental's own micro-based electronic-mail system in order to "integrate our purchasing process closely with their operations," Ross says. It's all a part of developing a close relationship between supplier and buyer. "We didn't take the lowest bidders on price, because they didn't offer the same services," he says.

Some companies do not subscribe at all to the method of playing one vendor's bid against another. "We just tell them to give us their best shot," says Tim Hensley, director of information technologies at Clorox Co. in Oakland, Calif.

Hensley says corporate buyers must remember that they are buying not just hardware but the retailer's ability to keep an inventory, deliver in a timely manner, integrate the new systems and test them out. "So if you go into negotiation with price being the main issue," Hensley says, "you are doing yourself a disservice."

Preferred treatment is often a benefit of such a relationship. For example, Clorox asked its retailer for a loan of five different laptops for a one-month evaluation, and the dealer complied.

"It cost them money to give us five laptops for a month, which we ultimately returned to them used," Henley says. "That's worth something to us. And to get that kind of service, it's not worth chiseling them down to the last dime."

Some companies prefer to deal directly — and closely — with one microcomputer manufacturer for product supplies and support rather than rely on a retailer. Before Wells Fargo Bank NA selected Tandy Corp. as its standard microcomputer supplier, officials from the California bank flew to Tandy's home base in Fort Worth, Texas, to interview senior officials and discuss at length the bank's needs and goals.

"We wanted more of a corporate philosophy than a retail philosophy," says Tom Egan, vice-president of the commercial banking group office systems.

"This way, we are kept up-to-date on Tandy's plans under nondisclosure," he explains, "and we can truly hold one party, the manufacturer, accountable for uptimes as well as downtimes."

The firm's commercial banking group eventually contracted for about 600 Tandy 3000 HLs, the Intel Corp. 80286-based model.

For Wells Fargo, support — not deep discounting — was the issue in negotiations. While Tandy offered volume discounts on its products, it could have purchased micros at greater price cuts from other vendors or retailers. The up-front costs, however, are often only a fraction of the long-term costs, Egan says.

Because the bank's microcomputers are dispersed throughout California at 24 regional operating centers, maintaining equipment through one central facility did not seem feasible. Thus, support became a major negotiating point between Wells Fargo and Tandy.

In acquiring microcomputer hardware, the PC buyer can choose between four separate distribution channels: retailers, such as Computerland Corp. or Businessland, Inc.; direct purchases from the manufacturer or a direct sales company; mail-order houses, such as 800 Software or 47th Street Photo; or value-added resellers (VAR).

In general, corporate America prefers retailers as its primary channel, according to recent studies. A February Computer Intelligence survey shows that among Fortune 1,000 companies, 43% acquire equipment through retailers, 28% from the manufacturer, 21% from VARs and mail-order and 8% from in-house company stores.

A recent International Data Corp. questionnaire asked PC executives to rate, on a scale of 1 to 4, the distribution channels preferred, with 4 being the highest. Retailers rated 3, with manufacturers following at 2 and mail-order and VARs vying for third place.

### Know your retailer

When negotiating with retailers, users say the best way to get a good deal is to know what the competition is charging, decide exactly how much support will be needed and buy in volume if possible. Maintenance and support can usually be bundled into a hardware purchase.

In addition, they advise taking a hard look at the retailer's maintenance staff if support is part of the package. "Look at a retailer's support staff as people who will need to know your business and make sure they can add value," Wells Fargo's Egan says.

The retailer can offer numerous benefits: attractive discounts, fairly fast product delivery and the ability to mix-and-match systems for a customer. An IBM sales agent, for example, is not likely to preinstall an AST Research, Inc. memory board on a Personal System/2 or provide a Hewlett-Packard Co. Laserjet Series II printer.

Retailers also offer maintenance, training and support — attractive options for corporations with overworked support staffs. But the pitfalls of dealing with retailers can be plentiful.

"Many of the retail stores hire inexperienced people to work on computers as a way of saving money, and those workers can do more harm than good," says Kevin Green, business administrator at Purdue University in West Lafayette, Ill. "Often the store will call us to ask how to solve a problem," he says, "and I think that's frightening."

Some corporations consider it a drawback for a retailer to sell a variety of products. "A retailer is deluged with the number of items they sell, and with all the changes that occur in technology, they have to try and equate all that with our business needs," Egan says.

Some see the retailer as an unnecessary third party that cannot offer the discounts, technical support and understanding of a particular business like a manufacturer can.

### 'Deep-pocket support'

"By dealing directly with the people who manufacture a product, you're more likely to get the deep-pocket support you need," Firestone's Farrell says.

"When you have a tough nut to crack, the retailer just has to turn around and go to the manufacturer," he continues. "That adds an extra delay, and it introduces an additional filter through which information about the problem can get confused in either direction."

Those who prefer to deal directly with the manufacturer say that, while the 25%, 30% or higher discounts offered for volume shipments are a bonus, the real benefit is being kept informed of the company's plans and having some input in future technology directions.

"We want to know what upgrades, enhancements or new products are coming from the manufacturer so we can plan accordingly," Egan says.

Again, to get the best deal, buy in volume whenever possible, keep abreast of what the competition is offering and, above all, assert your position clearly. Sherry Ryan, director of end-user computing at Levi Strauss, Inc. in San Francisco, says she insists on extremely aggressive discounts on any volume PC purchase. Stating a strong position like that up front weeds out the uncommitted dealers, she points out.

Depending on a company's needs, it might be wise to negotiate a maintenance contract in which a fee is charged only when actual repairs are needed.

"I negotiated with Tandy a predetermined fixed rate on how much it will cost to repair a PC,"

*Continued on page SR/8*

## The price of negotiation

Negotiating hardware and software contracts at the same time is not as common as one might suspect.

"We do enough volume that it makes sense to negotiate the big picture rather than just the pieces," says Kevin Farrell, manager of microcomputing and management services at Firestone Tire & Rubber Co. in Chicago.

In most cases, however, a company goes directly to the software vendor for volume purchases or to a retailer or a reputable mail-order house for discounts and quick turnaround, independent of hardware acquisitions.

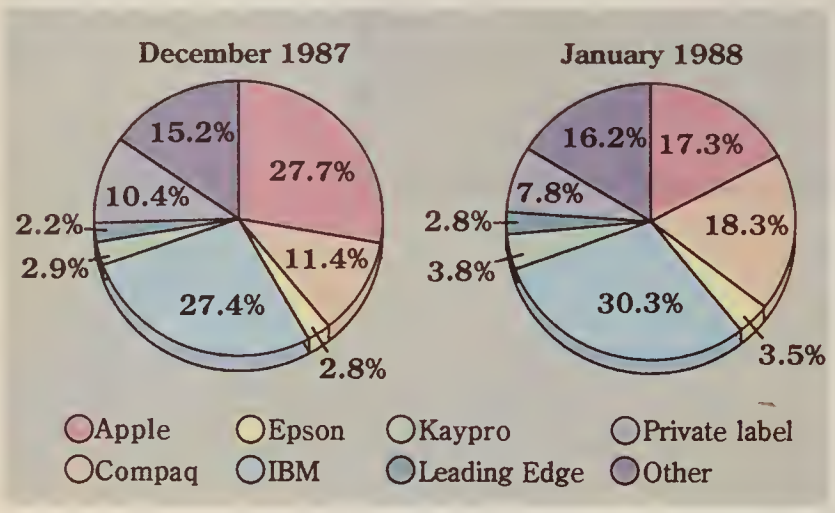
"If we needed 500 copies of Lotus 1-2-3, we would go ahead and get a site license," says Rick Pemberton, senior design analyst for Covia Corp., a travel industry services provider and division of United Airlines. "But if we just needed four or five copies of something, then we'd call Computerland."

Negotiating follow-up support and maintenance with the hardware is far more important than bundling software, users add, because software is more easily supported by a firm's own staff or by the manufacturer, via hot lines.

JAMES A. MARTIN

### Total microcomputer market share by manufacturer

*Percentage share by units sold in computer specialty stores*




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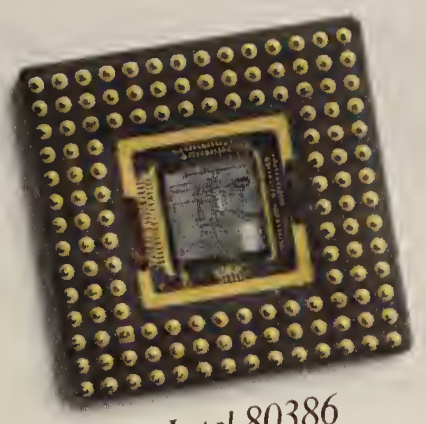
### Top 10 microcomputers

*Reflected by shipments to computer specialty stores, July 1987 to December 1987*

| Based on unit shipments | Percent of all micros sold |
|---|---|
| IBM Personal System/2 Model 30 | 11.8 |
| Apple Macintosh SE | 8.2 |
| Apple IIGS | 8.1 |
| PS/2 Model 50 | 6.6 |
| Leading Edge Model D | 4.7 |
| PS/2 Model 60 | 4.7 |
| PS/2 Model 25 | 4.7 |
| Compaq Deskpro 286 | 4.7 |
| IBM PC AT | 4.6 |
| Apple IIC | 4.1 |
| **Based on dollar shipments** | |
| Macintosh SE | 10.6 |
| PS/2 Model 60 | 9.2 |
| PS/2 Model 30 | 9.2 |
| PS/2 Model 50 | 8.8 |
| PC AT | 7.7 |
| Compaq Portable II | 6.4 |
| Deskpro 286 | 5.7 |
| Deskpro 386 | 4.7 |
| Apple IIGS | 3.1 |
| PS/2 Model 80 | 2.9 |

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# This chip is too smart to be in a personal computer.



*The Intel 80386 microprocessor*

# Introducing the corporate 386.

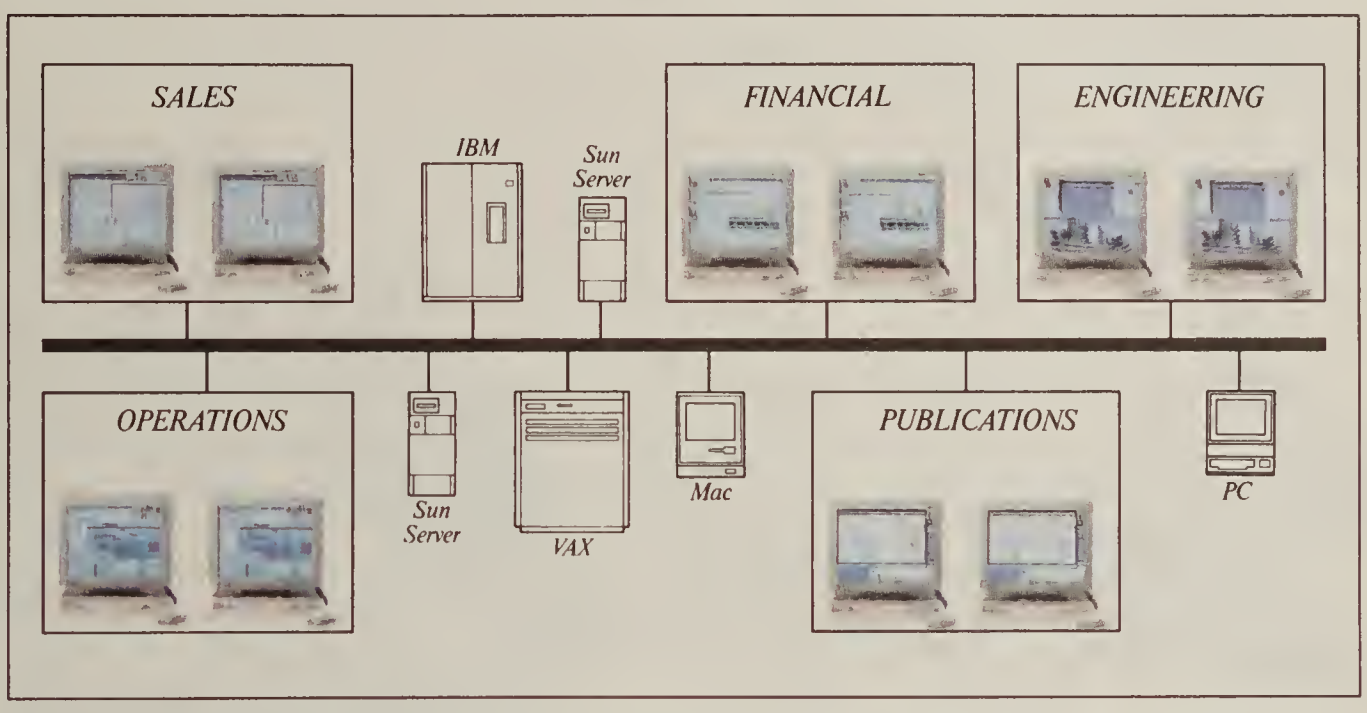



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And the right corporate choice.

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## Deal

FROM PAGE SR/4

Egan says, "and then I pay that rate when I have to, instead of signing a blanket contract and paying for service before I even need it."

An alternative to buying directly from the manufacturer is to deal with a direct sales vendor. Companies such as Corporate Software, Inc. in Canton, Mass., hire trained salesmen to deal directly with the corporate buyer. The companies offer more in-depth support than mail-order firms do, and they give buyers access to technical specialists trained in various application or hardware areas.



**Purdue University's Green**

Meanwhile, mail-order houses are gaining popularity as a distribution channel, although their reputation as quick-buck Charlies who might not be around after the sale still lingers in the minds of some users.

"Our purchasing department has certain requirements for a company, and they don't like dealing with anyone that might not be fiscally sound," says Rick Pemberton, senior design analyst at Covia Corp.

Others often call on mail-order companies for quick turnaround and good prices.

"We can't afford to stock any inventory, so we rely on mail-order firms to give us cheap prices and instantaneous delivery," Purdue's Green says. "Their technical service phone lines have been helpful, and if they can't solve a problem right away, they get back to us quickly with an answer."

Buying mail-order software is becoming more common among large firms, especially when only a few copies are needed.

"If we need something quick, we call up someone like 800 Software," Clorox's Hensley says. "Their prices are pretty close to Computerland's or Businessland's, they have a large inventory, and we don't need to worry about support — our users can get that through the software manufacturer directly or through our own Help line."

Because most mail-order houses already offer substantial discounts, price is less negotiable than with retailers and manufacturers.

VARs are not a major route for procuring new equipment, large PC buyers say. Many of the top U.S. companies now piece together their own microcomputer turnkey packages through in-house end-user computing services groups, which essentially perform the same services as a VAR.

But VARs are used by large corporations for specialized or vertical-market applications.

"In one case, we needed a complex airplane maintenance system for our small-aircraft division, so we went to a VAR for a specialized system and integrated software package," says Barbara Myers, director of finance and administration for MIS at Champion International, Inc. in Hamilton, Ohio.

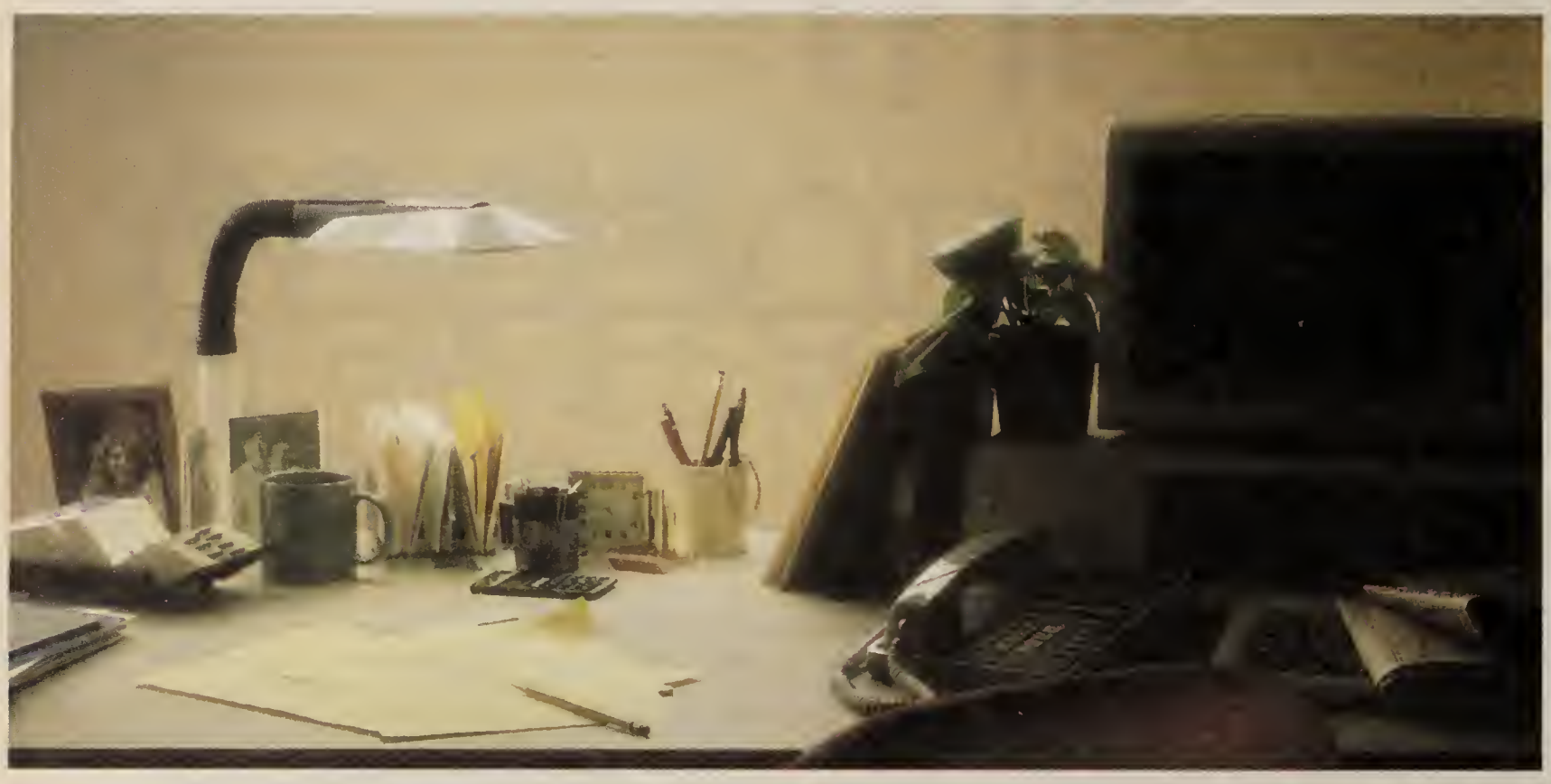
### Alternate routes

For most organizations, the best way to purchase microcomputers is to take several roads. Purdue University, for example, routinely purchases name-brand micros in bulk directly from the manufacturer at discounts of 40% to 45%, according to Green.

But when it comes to bringing an inexperienced user on-line with a new PC, he adds, a retailer that offers "hand-holding" services is the most appropriate channel, and the discounts are still strong — 30% to 35%.

One final option some corporations prefer is to skip all four purchasing channels and lease instead.

"In these times of rapidly changing technology, leasing is the best position to be in," says Terry Flanagan, hardware and software administrator at Airborne Express in Seattle. "That way, we're not stuck with trying to sell obsolete equipment. And the lease price vs. the purchase price runs about $150 per machine less over a three-year period." •



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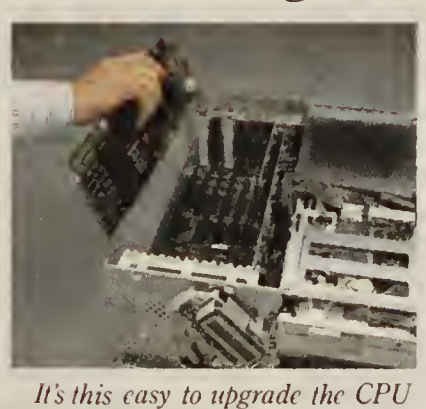
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# ROUNDTABLE



P. CHARLES LADOUCEUR

# THREE MEN AND A MICROCOMPUTER PURCHASING DECISION

MIS professionals are well known for spending millions on big iron. But these same people often spend more money on the microcomputer.

In fact, a new breed of MIS is keeping pace with the intricacies of buying hundreds or thousands of personal computers and related equipment. Not only are today's MIS professionals skillful in managing a staff, but they are well versed in hammering out a deal. No matter how many bargains you may have struck, there are always a couple of more points to be taken off a price and a few more elements that can be tossed in.

To get to the bottom of the PC buying process, *Computerworld* Editor in Chief Bill Laberis and Senior Editor Douglas Barney recently spoke with three MIS pros from three distinctly different organizations. Read on to find out how these gentlemen choose products and get the most bang for the corporate buck.

**How are PC purchases handled in your organizations?**

*Cavanagh:* I'm sure that some micros are bought at lunches and dinners [at Met Life], but most PCs are bought through my organization. We don't second-guess the people who want to purchase a PC; rather, we just facilitate the ordering.

That is, unless it's a very large program. When you get into the negotiation side with a vendor, you want to come from a position of strength. I know how many PCs we will be ordering, what they will look like and what the delivery schedules are going to be, so we can go out and negotiate.

We also have standards and recommendations as to what PCs users are going to buy. If it is OS/2, we recommend not touching anything below an IBM [Personal System/2] Model 60 because of the limitations of storage. We also know the Model 50 is not upgradable, so people should be aware of those things.

*Faistl:* We bring in PCs one by one, not dozens at a time. And I have been able to negotiate deals as high as 30% and make no commitments at all. But I'd much rather give up a couple of percentage points on price to find a dealer who has his act together on the integration issue.

**Does the user decide the model and style of PC to be purchased or does someone in MIS?**

*Cavanagh:* We'll make the recommendation. We have an information center store with a whole variety of PCs. Understand, there are two different cases. One is a program in which you are going to be installing, say, 1,000 or 2,000 PCs, and there, there is a very careful selection.

But if someone is, say, an investment analyst and wants a PC, often he has no idea which one he wants. Then we recommend that he go to the store, go to the information center and try out their applications. What [the user] thinks is a good application for a PC might not be. They might need a VM system, so we also have terminals connected to the mainframe.

*Perera:* At Ryder, we are responsible for any orders that are computer related. It must carry our signature or it won't be paid. Individuals who used to go around the system can't do that anymore. We have also created a bible that says, "Here are the standard products that we will support."

A user said to me one day, "When we buy through you, it's like when you used to buy from IBM 10 years ago. How can anyone blame you for making the wrong decision?"

**How does your approach to buying PC equipment today differ from, say, three years ago?**

*Faistl:* Three years ago, we put out a worldwide guideline that said you can buy any kind

of machine you want. But if you buy an IBM PC and use products like Lotus, Multimate and Dbase II, you will be supported out of our information centers in the U.S. and Europe. We didn't want to tell them no but wanted to influence their decision to stay in the fold, and that worked very well.

*Cavanagh:* We did the same things. The guy in charge of the information center invented a motto: Whenever someone would say, "Well, my friend in college said this is really good, and it's my money, so order it," he would say, "Fine, we'll put our stamp on it, and if it breaks, you own both halves."

*Faistl:* The hardest job you have is when a user has made up his mind about what he wants, and you have to tell him that it doesn't fit into your strategy or doesn't tie into your LAN. Now you have to defuse this user, and sometimes you can't do it.

**So you need centralized planning because of moving away from stand-alone systems?**

*Faistl:* Yes. At International Flavors, we have a workstation strategy that states that users will get an IBM 3270-type terminal or an IBM PC of some ilk. A PC to us is just an intelligent workstation.

We used to say to the users, "You need an IBM PC for the future," and that user would say, "Well, that will cost an extra $1,500, and I am never going to have to connect to anybody else." You had a tough sell at that stage of the game and had to use some political leverage.

Now the discounts you can negotiate are going up, and the prices are coming down. When I joined in 1983, we were getting a discount of 12% from a computer store. The second day I was there, I called the sales rep, introduced myself and told him that if he didn't up the discount, he was going to lose the business. Right before my eyes, he upped it about four points.

**Each of your organizations uses "short lists" to govern PC purchases. Just how were they established?**

*Perera:* I have an advanced technology supervisor whose purpose in life is to stay ahead of us by a year or two. This individual also calls on the information center and says, "What are your users needing; what should we do?" They work with vendors, bring equipment and software in and prototype.

At the advanced technology center, we bring in users and say, "Here is a box. Is it a usable product?" After it has been accepted as a box that we can use, we test it for integration, communications issues and all the rest. Then the information center and the advanced technology people meet and talk about problems, support and limiting issues.

We may have three to four boxes that do the same thing, but we have a criteria chart, which includes support, cost and so on. When a new model comes out that is better, we replace the older technology. We have things in that bible such as "Let's not order Model 25s and 30s; let's go with the 60 or 80s," or we may put in a little note like "A 70 is coming." It serves as a catalog.

**How critical is it for the advanced technology folks to be in touch with users?**

*Perera:* Very, but they also have to be closely involved with the manufacturer. They get [a lot of information under nondisclosure agreements].

*Cavanagh:* We put out an RFI [request for information], which says, "This is the problem we are trying to solve; here is the use; what do you want to propose?" The vendors will generally propose their advanced technology, not what is on the shelf now.

We ask them just how they are going to do the whole job: how they're going to package them, box them, burn them in, deliver them and maintain them. We ask, "If we screen some [support] calls, will you reduce your maintenance price?"

*Faistl:* We have two information center specialists and an information center manager who do everything. They evaluate new products. We also capitalize on evaluations of companies like Ryder and Met Life. We might evaluate a laptop by having the information center manager take it for a couple of weeks. We also have some key users who function as information center consultants..

**We know what you look for in a PC purchase. Now how do you select a channel of distribution?**

*Cavanagh:* For special corporate programs — such as our laptop program, which has a potential for 6,000 units — we go through an RFI process.

**What if the company does not sell direct?**

*Cavanagh:* Most of the companies we deal with would be systems integrators. The company we are dealing with on the laptop project is Honeywell. When companies like that bid, it might not be their own product, but they will take care of the packaging, delivery and maintenance, which is really what you are after.

Usually on those large programs we will go directly to the major vendors, [like DG, Wang, Honeywell and IBM]. We also tend to run our own help desks. Users can't call the vendor directly, and we can negotiate a lower maintenance contract. You eliminate the "no trouble found" calls.

*Perera:* Do you do Level 2 support?

*Cavanagh:* Sometimes we send people out who fix the box. We also have the [problems of the] onesies and twosies, and for those we go through Businessland. We are in the financial services business, not the computer business. If Businessland can do it, let them.

**Is there a cutoff point above which you deal directly with the vendor?**

*Cavanagh:* If users want 10 PCs, we go to Businessland. If we want 50 or 100, this involves putting a special bid together.

For software, we will say to our dealers, "Hey, we are going to have 1,000 copies. What kind of an arrangement can you make?" We will become the first-level support for software, given that some of [the users'] pricing funds our help desk. We tell the users, "We are saving you money; you save us money, and we will both come out winning."

**Do you ever use mail order?**

*Cavanagh:* No. I guess it [the problem] is the reliability. We are in the financial services business, and we want to be good at supporting that business. If the mail order is going to save us $100, it isn't worth it. It's not worth all the stuff you have to do to make sure our internal customer is happy.

*Perera:* It is difficult to deal with an invisible vendor, and typically [mail-order transactions] are not reliable. There is not a great deal of credibility in what they can provide you. I don't believe you save any dollars after adding all the special handling and all the other activity that you have negotiated. Also, they have a bad reputation.

*Faistl:* I remember a discussion with someone from 47th Street Photo. We met, and he proceeded to put the catalog on the table, and quizzed me about the possibility of doing business in the future. I told him I thought they would sell anything for a price. He said, "Yeah, absolutely right, we would."

I said, "You call somebody on your hot line, and you would be lucky to get the guy who knows PCs that day. You might get the guy that knows the Nikons."

**Do you deal directly with the vendor on software purchases?**

*Cavanagh:* It depends on the size of the order. If you're going to buy an accounting package to run at 1,000 sites, you should deal direct with the manufacturer.

*Perera:* That is how we do it.

**You're all IBM mainframe shops. What's it been like dealing with IBM vis-a-vis PC purchases?**

*Perera:* I think it was true a few years ago [that IBM was not interested in PCs]. But

*Continued on page SR/14*

# The participants



## Daniel Cavanagh

*Senior Vice-President*
*Electronic Installations*
**METROPOLITAN LIFE INSURANCE CO.**

Metropolitan's Dan Cavanagh speaks softly but buys a lot of PCs — 4,000 so far. As vice-president of MIS at the insurance giant, Cavanagh must make sure no mistakes are made when choosing PC-based systems. But with 20 years of experience, he is not likely to be hornswoggled.

Cavanagh's low-key appearance does little to hide the fact that he's a shrewd negotiator who covers all the bases when cutting a deal. If you sell to him, you better package, deliver, install and service those PCs. Do it right, and you may sell thousands of PCs or PC packages. Do it wrong, and someone else will get the business.

One of Cavanagh's most interesting projects involved equipping Metropolitan's field sales agents with laptop computers and software. As a result of his and his cohorts' work at Metropolitan, the sales force walks proudly with Zenith Data Systems laptops that are delivered, serviced and supported by Honeywell-Bull, Inc.



## George Perera

*Management Information Systems*
*Director of Operations, Technology & Administration*
**RYDER TRUCK RENTAL, INC.**

When Ryder Truck needs to shift its computing gears, it looks to the man behind the wheel, George Perera. The Cuban-born director of operations and administration steers his company's personal computer purchasing and standard-setting decisions with a firm hand, making sure that microcomputers also fit into the big iron picture.

For Perera, absolute compatibility with the communications boards and software of today and tomorrow is not a goal but a mandate. As a result, most of Perera's PCs are from IBM, the same firm that sold him a 3090 mainframe and more than 100 System/36 minicomputers.

Perera is an absolute believer in knowing where the company's PCs are and establishing a relationship with computer retailers that will go out of the way to service a client. He is also a believer in PCs, having helped father the firm's PC population explosion from eight in 1982 to more than 1,000 today.



## Donald Faistl

*Manager*
*Information Resource Planning*
**INTERNATIONAL FLAVORS & FRAGRANCES, INC.**

Creating aromas used to be the job of a craftsman, who would gracefully mix ingredients until the perfect odor emerged. At International Flavors these same craftsmen do much the same work. The only difference is that much of the mixing is done by robot arms controlled by workstations.

Microcomputers do more than make things smell and taste good at International Flavors. They also do the jobs that nearly every business requires, like creating documents, managing numbers and keeping a handle on data.

As manager of information planning, Don Faistl's job is to make sure these microcomputers are the right ones for the job, that they talk effectively to the host computers and that they get fixed when they break. But he also makes sure these machines are bought at the right price. Under his regime, typical microcomputer discounts have been upped from 12% in 1983 to some 30% today, leaving Faistl smelling like a rose.


FRUIT
PEAR
JFK
FRF
X-M

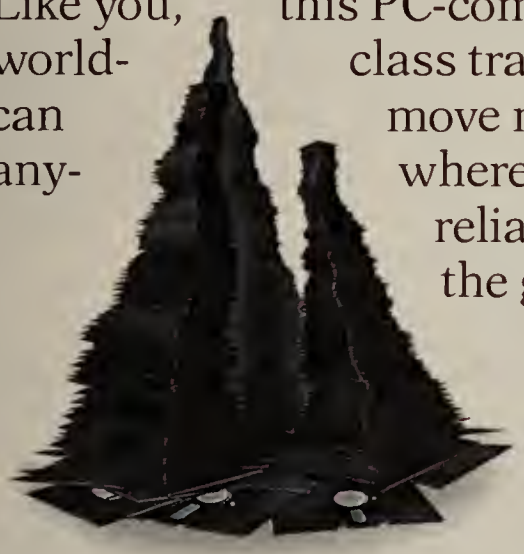
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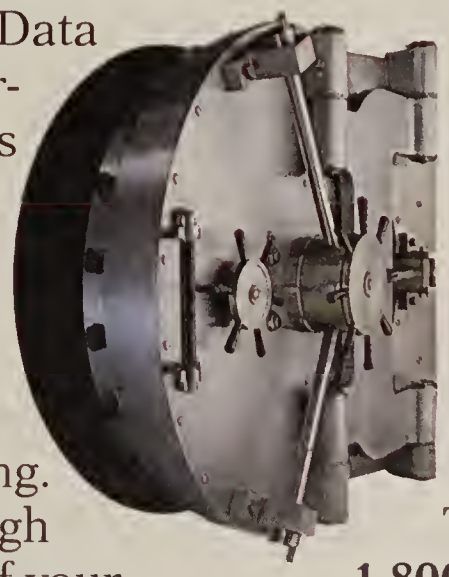
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# Three men

FROM PAGE SR/11

with the new commission policy, whereby the IBM branch office gets credit for the PCs placed in an organization regardless of where you get them from, that has changed that picture.

*Faistl:* But if the IBM marketing rep is going to get a commission whether I buy from him or not, what is his incentive to help me out?

*Perera:* That is a different story. I personally do get a lot of help from IBM, but I use a retailer in Miami. I bring the retailer into my organization for two reasons.

No. 1 is they provide two individuals on-site at all times to prepare the boxes. We ship everything into the Miami organization, prepare the boxes and ship them out. They also do the training.

The second reason is that I negotiate very large discounts, but to them I am the customer No. 1. When I call, 300 people get on the line. That is not the case with IBM.

The issue is not how much they know about VTAM, but how much do they know about your environment and business applications.

**On a scale of 1 to 5, with 5 being very aggressive, how would you rate IBM's aggressiveness in this second year of the Year of the Customer?**

*Faistl:* They are much more aggressive than they were three years ago. But they are still close to the zero mark, which means they were minus five before that. The problem is that they are lazy.

First, there is not a big margin that they make on a PC, so there is not much incentive for the salespeople to push PCs. The salespeople still haven't recognized the PC as part of a bigger picture. They don't realize that an increase in PCs eventually has an impact on your mainframe potentially needing another upgrade.

It would be nice for them to not only be aggressive, but also aggressive from the support standpoint.

*Cavanagh:* I think they are more aggressive. They realize that when you start dealing with other vendors, or other accounts with PCs, why would you stop with PCs? It is account control: They realize PCs are a key part.

Right now, from a timing standpoint, the OS/2 software is not there. They can't go out and say they've got something that no one else has.

*Faistl:* It has been typical of IBM to try to intimidate the customer into waiting. They have done it on the mainframe side; they have done it on DASD. What happens if you have the IBM guy say, "Hey, if you buy that equipment over there, is it going to be OS/2 compatible? What if you want to download the Nynex yellow pages? You need a faster chip."

A lot of it is so much hype. If you have somebody who is not knowledgeable about what the requirement is from the standpoint of the business, you can get snowed and become paralyzed.

**How do you avoid that?**

*Faistl:* Just because somebody tells you something, you can't assume it's genuinely true.

*Perera:* You also have to try it in your business.

**It seems like the software vendors have jumped into this game.**

*Perera:* We in information systems management have a responsibility to educate our users. I think we have to establish orientation programs that say, "What you read in the magazine on the airline is just advertising. Here is the truth behind it."

Users are becoming a lot more intelligent when it comes to the computer world. You have to act as a mentor so they understand the meaning of the recommendations made by IBM.

*Faistl:* You see companies coming out with announcements of products that will be delivered three years later. That just adds confusion to the situation. We have to diffuse that confusion. People have been talking about OS/2 for how long? It is like two people sitting on the bed talking about sex, but when it is ready to go, you want to get up and leave.

**From your experience, how can companies negotiate the best deal in PC equipment today?**

*Perera:* The key is to deal with more than one supplier. Play one against the other. Select the top ones for your organization based on your needs. Then play one against the other, including a third one: the manufacturer. But you know right away that the manufacturer's price won't likely be the best price.

*Faistl:* Yeah, play one against the other, then sign deals with both of them. Negotiate as best as you can and then do business with both of them at the same time. I've done that just to try to find out what was fact and what was fiction. That's saying, "Look, we'll give you a shot at it, but recognize that I've got my eyes on you and I'm going to see how you perform."

Hang a carrot out in front of them. We take a six-month worldwide inventory of PCs and word processing equipment. Then we track growth by geographic area, and I have this all charted. You find that everyone wants to know how many PCs you're going to buy this year, how many you're going to use. And I say, "Beats the hell out of me, but what I can tell you is the growth here over a period of 13 or 14 months," and I say, "I have no reason to believe this isn't going to continue."

*Cavanagh:* Do comparison shopping. Don't be afraid to ask questions. Also, be precise: We try to know exactly what we want; let the vendor know exactly what we'll do and put it on the table. We'll take it from here to there and don't charge us for any of these items.

*Perera:* Another thing you can do is to say to the vendor, "We are very large in the [market] area we are in, and we'll serve as your showplace." I've said to the vendor that you can bring in customers and potential customers, and you can use me as a reference. That will give you percentage points [off].

*Faistl:* Above all, you have to know what your objective is, and you also have to know the objective of the guy walking in the door. If he's there to sell to you and to get his foot in the door for the first time, he's going to be a lot hungrier than someone else. You have to be an educated consumer. If you're not, you're not going to get the best deal. Three or four years ago, my focus was price. It's not today.

Today, it's support — not screwing up the installation, getting the vendor to help me best leverage my resources and manpower. If the user has to pay 1% more for a PC, that's acceptable if the support is there. •

# Milk, bread and a floppy

BY LAWRENCE STEVENS

An old-fashioned price war erupted in St. Louis last month. It started when Egghead Discount Software launched a three-store grand opening in a market that had been dominated by Babbages, Inc., a retailer that was already discounting too heavily to suit some local dealers.



LES KANTUREK

Egghead Discount plastered newspapers with advertisements listing very low prices to commemorate its opening. Babbages followed suit with ads promising even lower prices. Before things settled down, a St. Louis consumer could buy Lotus Development Corp.'s 1-2-3 for $297, compared with $350 before the price war, and Microsoft Corp.'s Word for $219, compared with $360.

Representatives from Babbages and Egghead Discount decline to comment on the price war. But it is clear from that event that microcomputer software retailing has entered a new phase.

Microcomputer software has traditionally been sold in specialty stores that tend to have small inventories and few, if any, demonstration disks. But more retail outlets are selling software in ways that most consumers are used to buying everyday products.

They feature inviting decors and displays, spacious aisles that encourage browsing, large inventories, an opportunity to try out programs before purchasing and even return privileges.

**Want a book with that?**

New entries in this revolution of sorts include three firms that have wide experience in mass merchandising. B. Dalton's Software Etc. division has 130 stores, Babbages has 59, and even K Mart Corp.'s Waldenbooks now has a Waldensoftware division with 11 stores. Egghead Discount started from scratch and has been able to build a chain of more than 100 stores in four years.

The philosophy of all these chains is to sell software the same way other companies sell shoes or books — as a commodity rather than a high-tech specialty.

"Most computer stores are not really equipped to handle software," says Jack Ford, president of B. Dalton. "They keep small inventories, there are few demonstration versions available and the stock of home-type software — such as games and educational packages — is usually short." As a result, Ford says, customers have to buy products out of a catalog or, at best, after reading a blurb on the back of a package. "It's not the way most of us are used to shopping," he admits.

The primary target of these outlets is the home computer user. Stores in malls are a good place for the weekend impulse buyer to stumble on Microsoft's Flight Simulator, for example, but Waldensoftware, for one, plans to try reaching the corporate market by having sales clerks telephone local corporate accounts. And Egghead Discount has an outbound sales division through which it has been able to reach corporate customers.

Most purchasing agents, however, contend that browsing in mall-based stores is simply not the way they are used to acquiring software.

"Things like nicely decorated stores, friendly clerks and return privileges don't really appeal to us," says Joe Coresky, director of microcomputer development at The Travelers Corp. in Hartford, Conn. "We're more concerned with service, and we need reps who can let us know about new releases."

According to Coresky, MIS wants to deal with suppliers that are experienced with large corporations. Merchants have to be prepared to meet with buyers, deal with a company's accounts payable department and submit bids when necessary.

"We also like companies that can hold products that we purchase frequently in local stock in order to free up our warehousing requirement," Coresky says. "Price is, of course, also important, but it's not the uppermost concern."

**Three-dimensional catalog**

However, David Culley, Egghead Discount's senior vice-president, says his firm's major accounts sales force provides all the services corporations need. He says there are advantages for the corporate buyer in having a software supplier that offers both a direct-sales force and a local retail store.

"We encourage our corporate customers to use the local store as a 'live catalog,' where they can browse and then order products with the appropriate discounts from their direct salesperson," he says.

The issue of price is more important in these consumer outlets than it is in computer specialty stores, which seldom give prices over the telephone. Still, none of the chains want to be viewed primarily as a discount house or have its prices compared with mail-order dealers.

Glenn Ochsenreiter, director of Waldensoftware, says, "We sell at about 10% to 30% below list price. But we're a retailer, not a factory outlet."

Stevens is a free-lance writer based in Springfield, Mass.

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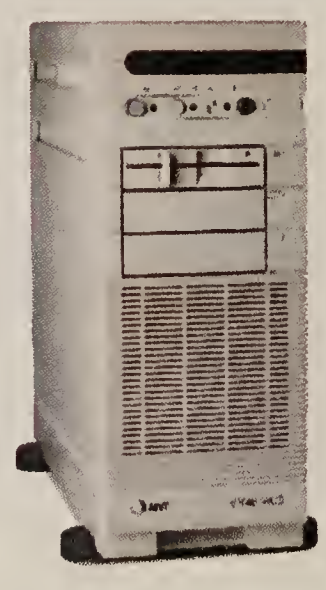
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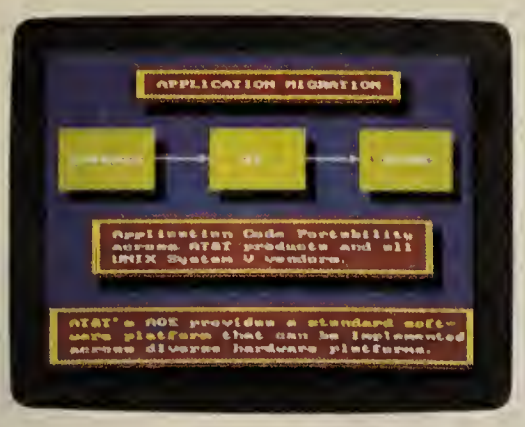
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Running out of expansion slots in your computer is a major headache.

And since the industry promises even more exciting and powerful plug-in boards tomorrow, the problem is just going to get worse.




So, in addition to providing for more memory, the 32-bit path lets you plan ahead now for high-performance boards in the future.

The 6386E WGS has an unprecedented 10 expansion slots: four 32-bit paths, four 16-bit slots, and two 8-bit slots. (8 and 16-bit boards can be used in the 32-bit slots.)

The 6386 WGS offers seven slots: three 32-bit, two 16-bit, and two 8-bit.

No other 386 computer series gives you more expandability.

**Add up to 5 magnetic peripherals inside the machine.**

The AT&T 6386 WGS lets you add up to five mass-storage peripherals including tape drive – *right in the machine*. Why clutter up your desk with outboard units?

**Keep on using your current media by choosing inboard 3½-inch with a 5¼-inch disk drive option.**

Why waste time converting all of your 5¼-inch diskettes just to accommodate a machine that forces you to use 3½-inch diskettes?



**Run at up to 20-megahertz clock speed.**

The 6386E WGS flies with its 20-megahertz clock speed (16 or 20 megahertz for the 6386 WGS).

**Choose from four industry-standard graphics protocols: EGA, CGA, MDA, and AT&T.**

The 6386 WGS series supports virtually every graphics display device on the market.

**Get total compatibility with existing XT and AT computers.**

The AT&T 6386 WorkGroup System is totally hardware-compatible with the IBM** XT and AT.

Virtually all the plug-in boards designed for earlier 8086 and 80286 machines will work in the AT&T 6386 machines.

**Expand RAM as needed.**

As new operating systems emerge, you need all the RAM you can get.

Today's new operating systems and applications are significantly more memory-hungry.

| FEATURE | AT&T 6386 WGS | AT&T 6386E WGS |
|---|---|---|
| PROCESSOR | 80386 | 80386 |
| CLOCK SPEED | 16/20MHz | 20MHz |
| RAM (STANDARD) | 1MB | 2MB |
| 5.25" DISKETTE | 1.2MB 360KB | 1.2MB 360KB |
| 3.5" DISKETTE | 1.44MB | 1.44MB |
| TOTAL INTERNAL DEVICES | 3 1/2HT + 1 FULL | 3 1/2HT + 2 FULL |
| TOTAL HARD DISK CAPACITY | 435MB | 600MB |
| STREAMING TAPE BACKUP | 40, 60 OR 125MB | 40, 60 OR 125MB |
| EXPANSION SLOTS | 7 | 10 |

More RAM lets you run multi-tasking and multi-user applications much more quickly. You avoid wasting time in unnecessary disk access, because the 6386 WGS lets you expand RAM as your needs increase.

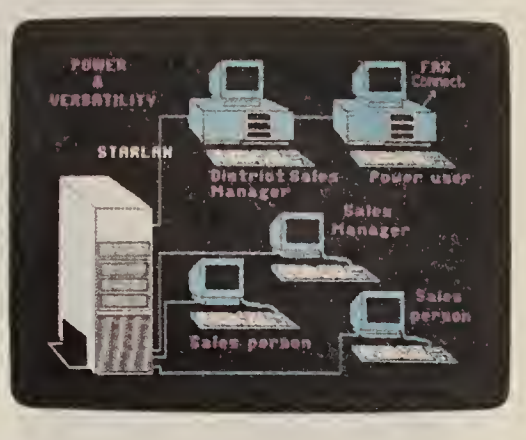
**Plan for the future by entering the AT&T Application Operating Environment.**

If you're running PC applications today and find that you need to enlarge your workgroup sometime in the future, you won't have to build an applications library from scratch.

The AT&T AOE lets you port your UNIX System V software essentially unchanged to departmental size minis (including AT&T's 3B computer family & RISC based machines) and mainframes, so you can start running powerful 386-based applications now, without fear for tomorrow.

**At the same time you can build a fully networked PC workgroup.**

The 6386 WGS is compatible with a wide range of peripherals, including AT&T's laser, letter-quality, dot-matrix, and line printers; plotters; and high-performance display terminals.




A single AT&T STARLAN Network can link from 2 to over 100 PCs, which means individuals in your workgroup can share printers, access the same data, and send messages.

AT&T's modular architecture and twisted-pair wiring make it easy for you to add stations as needed.

**How to protect your freedom of choice.**

To avoid buying the wrong machine, take a close look at the AT&T 6386 WorkGroup System. For more information on the 6386 WGS, the AT&T STARLAN Network, AT&T printers and terminals, and the Applications Operating Environment, call your AT&T Account Executive, Authorized AT&T Reseller, or dial 1 800 247-1212. AT&T can arrange for you to examine the 6386 WorkGroup System, the STARLAN Network, and other components you'll need to build a productive workgroup. Either at a facility near you or by special arrangement at your business location.

From equipment to networking, from computers to communication, AT&T is the right choice.

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**IBM is a registered trademark of International Business Machines Corporation
Lotus is a registered trademark of the Lotus Development Corporation.
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AT&T
The right choice.



DAVE FLAHERTY

# YOU DO THINGS YOUR WAY; I'LL DO THINGS MY WAY

BY AVERY L. JENKINS

## RETAIL STORES

There are four ways to buy personal computers, add-on cards, hard disks and software: through a local retail store, a mail-order firm, a value-added reseller (VAR) or a direct-sales vendor or manufacturer. Each approach has its pros and cons.

Second only to volume purchase agreements with manufacturers, the traditional means of buying a PC is through local retail stores. In addition to providing volume discounts similar to those available directly, retailers have proven to be a valuable source of information and support for corporations and consumers.

"When I first started buying PCs for people, retail was really the only game in town," says Theresa Carey, president of Alta Business Systems, a San Francisco-based consultancy. Because PC knowledge was not yet widespread and other distribution channels were limited, the traditional retail approach of full service with full price worked.

Today, despite a more savvy customer base and a few lean years, retailers are still successful. In addition to after-sales support, the retail-store showroom offers a place where you can "kick the tires" of the machines, says consultant Todd Reidel, president of First Micro Group in Boston.

A second advantage is that the customer can develop a working relationship with the sales agent. However, warns Kevin Green, business administrator at Purdue University, turnover is high, and the person with whom the purchasing agent has developed a relationship today may be gone tomorrow. "A lot of these places are revolving doors," Green says.

Jenkins is a Cambridge, Mass.-based free-lance writer.

In the beginning, retailers were the heart of the PC distribution chain. While many companies arranged volume purchase agreements directly with PC manufacturers, it was often the retail firm that stepped in with the software, peripherals and support that such agreements did not provide.

But the retailer has ridden a rocky road in the past few years. The tough economics of computer retailing have gotten tougher, weeding out weaker companies.

### A survivor

One of the survivors is Businessland, Inc., a San Jose, Calif.-based chain. The number of Businessland stores is up from 60 in 1985 to 94 this year, and the company has increased its sales force from 540 in 1985 to 700 this year. During the same period, sales have almost tripled, from $267 million in 1985 to $718 million in 1987.

"We are fairly happy with our current penetration in the U.S. market," says Enzo Torresi, Businessland's vice-chairman. Although he says he plans to open three more stores this year, "we are covered in those top markets where we wanted to be."

But Businessland has survived by shedding the retail image as fast as possible. When describing the company's strategy, Torresi avoids using the term "retailer."

"Think of Businessland as a very specialized VAR," he says, "a national VAR — we have a lot of purchasing power."

The company-owned stores, into which Businessland has poured about $1 million each, are no longer considered "stores" in the corporate strategy. "Our computer center is not a retail store," Torresi says. "It is a demo facility."

And all of Businessland's employees are employees of the corporation — not of a local franchise.

This technique has permitted Businessland to avoid some typical retail pitfalls. A classic complaint of the retail customer is that today's computer salesman is yesterday's shoe salesman; many customers feel they know more about the product than the sales agent does.

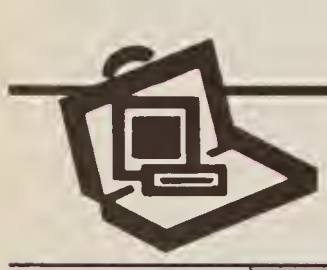
Businessland combats this problem with an emphasis on training that begins the first two weeks a salesperson is hired. As sales representatives progress to become marketing representatives, they are again brought back to headquarters for advanced training.

"We invest more money than any company we know of in sales training and technical training," Torresi says. In total, Businessland spent $4 million on training in 1987. That includes training for the company's technical support personnel, whose number now nearly equals the sales staff's. Businessland's 600 technical specialists receive more frequent training to keep up with the changing technology, Torresi says.

A second problem that plagues most retail operations is the high turnover of sales staff. But Torresi says turnover at Businessland is "not as bad as you might find in traditional retail." While retail turnover often runs as high as 40% to 50% annually, Torresi says Businessland's runs between 20% and 25%.

Torresi foresees an increasing specialization of Businessland's staff. There are "very big and very important sectors of technology where we will have to specialize our people," he says. Even the sales staff may become a diversity of specialists rather than a collection of generalists.

"We are not doing that now" through strategic direction or policy moves, Torresi says, but "that is happening de facto." Specialization will come to the sales force, he says, "as a natural fact of life." •



**Direct sales vendors**

| Pros | Cons |
|---|---|
| • Competitive prices<br>• Good vendor-buyer relationship<br>• Good after-sales support | • No steep discounting<br>• No local service |

CW CHART




**Retail stores**

| Pros | Cons |
|---|---|
| • Full service<br>• Good buyer-vendor relationship<br>• Hands-on demonstrations | • High price<br>• High sales force turnover<br>• Lack of knowledge on specific products |

CW CHART

# WITH FOUR PATHS TO LEAD YOU, THERE'S MORE THAN ONE WAY TO BUY A PC




## VALUE-ADDED RESELLERS

The undisputed king of the support hill is the VAR.

Buying from a value-added reseller (VAR) is not unlike being driven by a chauffeur. You don't need maps to chart your way through unfamiliar territory, and if you have a favorite drink, you can make sure the car's bar has been stocked with it.

According to Kevin Green, business administrator at Purdue University, a VAR is useful when an organization has a special need that cannot be met by off-the-shelf software.

Buying from a VAR is a "much less headache-inducing process," adds Todd Reidel, president of First Micro Group in Boston, because the VAR puts all the pieces together for the buyer, and the software is designed to match the specific application — requiring no homespun programming by the user.

But VARs, like limousines, don't come cheap. The software, if custom designed, is often much more expensive than generic packages. It may use proprietary technology, which can also drive the cost up. And while a good VAR may also provide extensive support, the use of proprietary software and technology can create an uncomfortable dependence on that single vendor.

### Centel: A PC 'general contractor'

Just as Businessland, Inc.'s Enzo Torresi prefers to call his retail business a "national VAR," Edward Sharp, senior vice-president at Centel Business Information Systems, a leading VAR, sees his company as more of a retailer.

Whatever you might call it, Centel performs many of the same functions as a VAR — perhaps, in this company's case, the term "general contractor" makes more sense.

Centel is a division of Centel Corp., a Chicago-based telecommunications firm with $1.4 billion in revenue in 1987.

The Business Information Systems unit had revenue of about $140 million last year, Sharp says, adding that the income was split almost equally between commercial and government sales.

While the company operates only three retail centers, it has more than 70 service locations throughout the country, staffed with about 300 people.

And, Sharp admits, Centel does offer the customized software, implementation and ongoing support that are the hallmarks of a VAR.

### Going horizontal

Centel differs from the traditional VAR definition in that it does not restrict itself to a single vertical-market application.

Instead, Sharp says, the company focuses on customers with dispersed geographic locations who need to integrate personal computers into operational applications throughout those offices.

This is where the general contractor function comes in.

Centel at one time offered custom software developed in-house. But, Sharp says, "we were doing a lot more of that three to four years ago than now."

Centel's current strategy is to use outside software developers with expertise in the application required by Centel's customer. Such a company is hired as a subcontractor, working under Centel's direction to develop the specific application. In the process, Sharp adds, Centel employees learn enough about the system to provide thorough support.

Sharp says Centel's customers are companies faced with a "make or buy" decision. A company folding PCs into its corporate data processing environment, he explains, is faced with the choice of either designing, implementing and supporting PC integration or buying the service from a company such as Centel.

Sharp claims that buying the service is often cheaper because the company would otherwise have to create a support staff from scratch or extend its existing PC group.

Centel offers what it calls program management, which completely off-loads the struggles of implementation and support.

For example, Chrysler Corp. has asked Centel to install micros and implement their use and support at Chrysler's recently formed Jeep/Eagle dealers.

Sharp says Centel is strongest in the heavy truck and farm equipment industry and includes customers such as Ford Motor Co.'s New Holland subsidiary. Other corporate clients include Aetna Life and Casualty Co. and Chase Manhattan Bank NA.

In addition to providing 24-hour hot line support for its clients, Centel also offers management tracking reports. These monthly reports tell clients what problems have been encountered with their PCs, which ones were resolved and which remain. Centel also maintains all information about each installation, including the number of PCs and how they are configured.

Through its customized software services, planning and after-sales support, Centel's objective is to off-load the problems of implementing PCs at scattered corporate offices and plants.

And while these companies "tend to be the architects of their own systems," Sharp says, "they call on us to be the general contractor." •

**VAR — Value-added resellers**

| Pros | Cons |
|---|---|
| • Meet specialized demands<br>• Extensive service<br>• Turnkey systems | • Single-vendor dependence<br>• Proprietary technology<br>• High price |

CW CHART

**Mail-order firms**

| Pros | Cons |
|---|---|
| • Low cost<br>• Fast service | • Little after-sales support<br>• Hardware must be installed by purchaser<br>• Caveat emptor |

CW CHART

# Good news: Your tech's in the mail

MAIL-ORDER OUTLETS

From the depths of hackers' magazines, mail-order houses have risen to become a valued purchasing method for software, add-on cards and peripherals.

Mail-order distribution often holds the twin keys to success — speed and price. While in many cases retailers have cut back on their inventories, mail-order houses often promise overnight delivery.

Since overhead is low for these companies — they have lower or nonexistent sales commissions and no showroom to support — mail-order firms sell at rock-bottom prices.

But this industry is notorious for its fly-by-night companies and an absence of after-sales support. Hardware installation is left entirely in the hands of the buyer. Often, the only support provided is the toll-free number of the equipment manufacturer or software developer.

However, "if you know what you're buying and you're buying from a reputable dealer," says Todd Reidel, president of the First Micro Group in Boston, "you can achieve tremendous price advantages over retail."

### Mail-order mogul

The intersection of rural two-lane roads sandwiched in the foothills of the White Mountains, Marlow, N.H., is not the ideal location from which to get the world to beat a path to your door.

Unless you are a mail-order company.

Marlow is the home of PC Connection, one of the most successful mail-order firms in the industry. Since its founding in 1982, PC Connection has succeeded in becoming a favored supplier of software and peripherals for many organizations.

Starting with just a few employees four years ago and growing to 175 now, the company's annual revenue exceeds $100 million.

As director of customer affairs, Peter Haas is the company's roving troubleshooter. He says the company's success with corporate buyers results from the careful attention PC Connection pays to its image.

To woo individual customers away from other mail-order firms, PC Connection does not add a credit card surcharge, a technique many such companies use to boost their margins.

"The industry as a whole is worried about its reputation. There have been some outstanding scams," he says, adding that "some [mail-order] companies are not really illegal but do provide what people feel is unsatisfactory service."

Service is part of what PC Connection promises, especially to its corporate customers. It has about 18,000 such accounts, although Haas notes that a large company might have separate accounts for each of its divisions.

Haas says many firms now have purchasing agents who specialize in buying PC equipment. It is the PC analyst or information center manager who may decide whether to buy a software package or peripheral, but it is the purchasing agent who decides where to buy it.

Price is important to the purchasing agent, but support remains the priority for users. As a result, PC Connection dedicates 12 employees to act as technical support specialists for the software and hardware that the firm sells. •

AVERY L. JENKINS

## Micros by mail

*Top five mail-order firms by amount spent on advertising in 1987*

| | Estimated amount spent (in millions) | Specialty |
|---|---|---|
| **PC Connection/Mac Connection**<br>Marlow, N.H.<br>603-446-3383 or 800-622-5472 | $5 | IBM PC and compatible, Apple software and peripherals, Toshiba laptops |
| **Compuadd/PC Source**<br>Austin, Texas<br>512-250-1489 or 512-331-6700 | $3.5 | IBM PC-compatible hardware, software and supplies |
| **Logicsoft**<br>Farmingdale, N.Y.<br>516-249-9700 | $2.7 | IBM PC and compatible hardware, software and supplies |
| **PC Network**<br>Chicago<br>312-280-0002 | $1.9 | IBM PC and compatible hardware, software and supplies |
| **CMO/Computer Mail Order**<br>Williamsport, Pa.<br>717-327-9575 | $1.8 | IBM PC and compatible and Apple hardware, software and supplies |

INFORMATION PROVIDED BY ADSCOPE, INC.
CW CHART

# Direct sales occupy halfway point

DIRECT SALES

Sitting at the crossroads between mail order and retail are direct sales companies.

These vendors might best be described as either retailers without the store or mail-order houses with salesmen.

With an emphasis on corporate rather than individual or small-business accounts, as well as a better reputation, direct sales firms provide "a nice halfway point for folks who don't want to go out on a limb and buy mail order," says Todd Reidel, president of the First Micro Group in Boston.

Direct sales often come close to or match the prices of mail-order firms and also provide the personal relationship and support of a retail operation.

## At the crossroads

*Corporate Software is a successful combination of a retail firm and mail-order house*

| | Revenue | Earnings |
|---|---|---|
| 1983 | 0 | ($79,000)* |
| 1984 | $1.7M | ($621,000) |
| 1985 | $14.7M | $1M |
| 1986 | $32M | $1.5M |
| 1987 | $59.8M | $1.9M |

* Parentheses indicate loss

CW CHART

And while the usual retail salesperson is a generalist — adept at holding the hand of the novice user but lacking the knowledge to solve more complex problems — the successful direct sales companies offer more in-depth technical support by specialists in different application or hardware areas.

### A success story

The most successful of these firms is Corporate Software, Inc. in Westwood, Mass. This company embodies the cross between retail and mail order. Founded in 1983, Corporate Software claims that 80% of the Fortune 1,000 are currently among its 2,000 customers. Its net sales in 1987 were $59.8 million, almost double the company's previous year's sales.

Like a mail-order firm, Corporate Software's headquarters houses no demonstration rooms but does include a warehouse and shipping department with a $7 million inventory.

Like a computer retailer, it maintains a direct sales force to provide personal contacts with its corporate clients, and the company has 11 offices scattered across the U.S.

But that is where the similarities stop. From its founding, Corporate Software has based its strategy on direct sales to large accounts, some discounting and after-sales support.

According to founder and Chief Executive Officer Morton Rosenthal, Corporate Software's strategy is simply to provide its customers with the services necessary to "better manage this massive installed base" of personal computers found in most large companies.

While Corporate Software also tries to keep its prices competitive, "we aren't always the lowest price," Rosenthal says. On the average, customers will pay 5% more than they would through a mail-order house.

The main thrust of the company's strategy is to provide services that take some of the burden of PC management off the information manager's shoulders. Corporate Software does this through several avenues.

Like most other PC distributors, the firm provides technical support for its customers. One-half of the firm's 60 support personnel provide telephone support in areas of specific expertise, such as spreadsheets and word processing.

While the company faced tough times in 1984 when it was forced to lay off some of its employees, the problem was not strategy but pricing, Rosenthal says. By dropping prices without dropping support, the company rapidly turned around.

"Companies that are opportunistic and do everything for everybody have not done well," Rosenthal says. He adds that the increasing complexity of the PC market will make that strategy even more difficult in the future.

Rosenthal predicts that the addition of connectivity, IBM's OS/2 and other factors to the marketplace will play into his strategy.

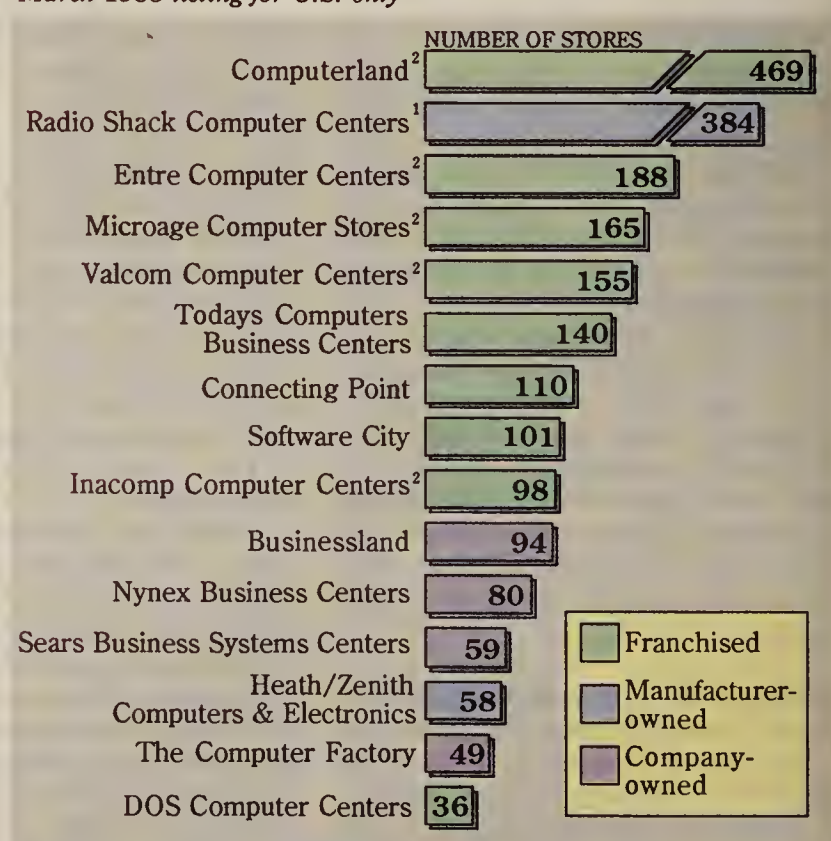
For example, Rosenthal says that in spite of the recent release of OS/2, "nobody cares about the operating system. Will people start to care? In a big way," he says. "As soon as some of today's software is available under OS/2, it will make a difference."

Corporations will be converting to OS/2, he says. And they "will use us as a resource when they do." •

AVERY L. JENKINS

## Leading computer specialty store chains

*March 1988 listing for U.S. only*




[1] Radio Shack also has more than 1,350 consumer electronics stores with computer departments

[2] Includes franchisor-owned stores

INFORMATION PROVIDED BY STOREBOARD, INC.
CW CHART

# How Macintosh II came to be one of the safest decisions in business.



# First, we met your standards.

***Compatibility.*** *Digests data from—and even runs—MS-DOS programs. Works with mainframes, too.*

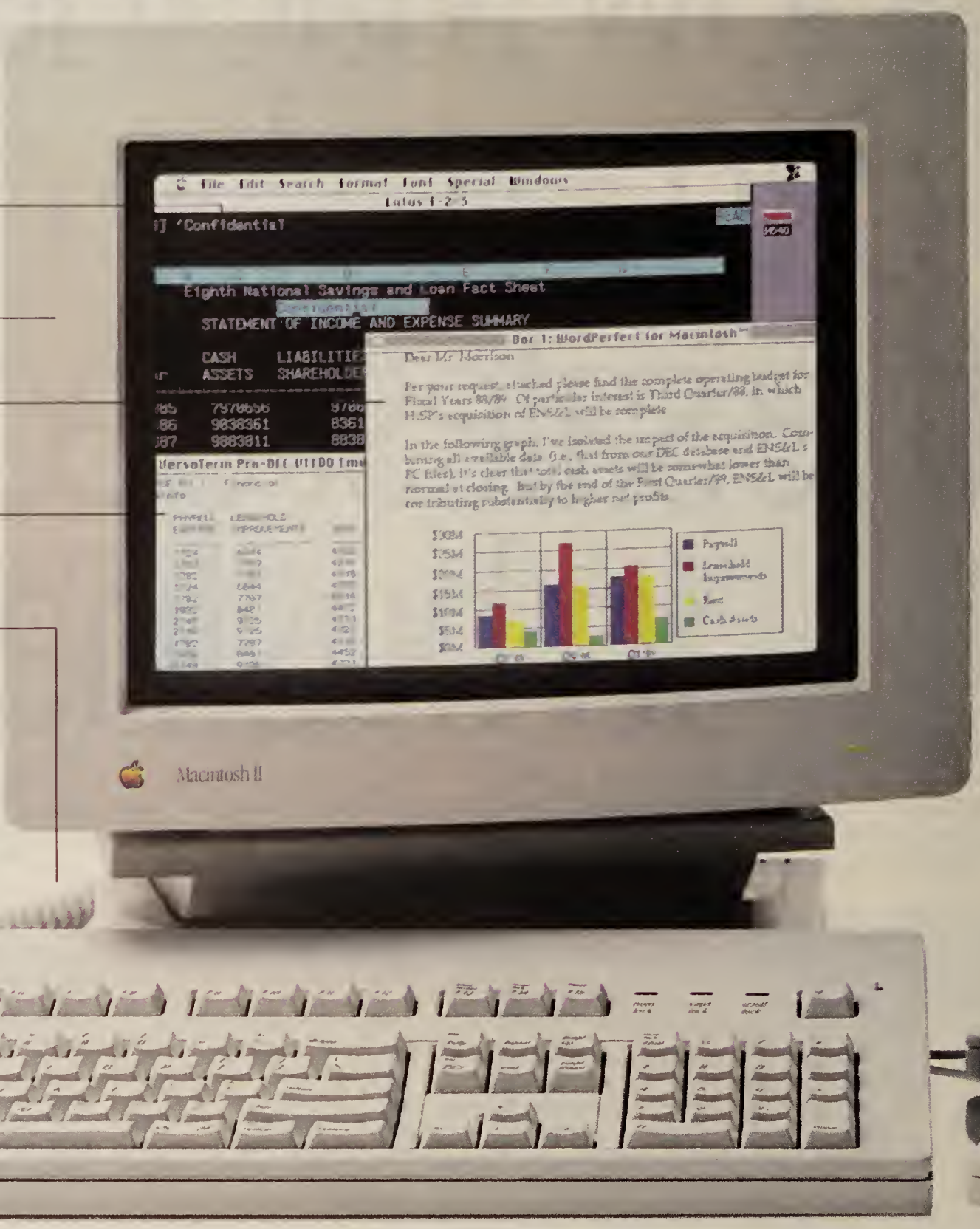
***Display.*** *Choose from all shapes and sizes, including color and large-screen.*

***Applications.*** *Offers a choice of sophisticated software for every business application, from word processing to financial analysis.*

***Connectability.*** *Links up with the rest of the office via AppleTalk using a variety of cabling, including Ethernet.*

***Raw Power.*** *Blazes with math co-processor standard. Vast memory starting at 1 MB. Internal storage to 80 MB.*

***Expandability.*** *Six expansion slots mean you can grow as quickly as you can say, "More power, please."*




Business computing has recently undergone some fairly radical changes. Consequently, so has the idea of "safety."

Because at present, only one computer offers all the promise for the future, and has the power to deliver on it today:

The Macintosh® II personal computer.

Rest assured, it can meet every standard that serious business demands.

Like breakneck speed. Full expandability. Vast memory. A choice of monitors. A wide range of sophisticated programs for every business use. And the capacity to store even the most intimidating mountain of information.

Its own power aside, Macintosh II is also quite prepared to meet the standards of other machines. Whether they speak MS-DOS, UNIX or assorted dialects of mainframese, from IBM to DEC.

So it can easily digest files from—and even run—MS-DOS programs like Lotus 1-2-3 and WordPerfect.

Connections are perfectly painless via the AppleTalk® network system, using a number of cabling schemes, including industry-standard Ethernet.®

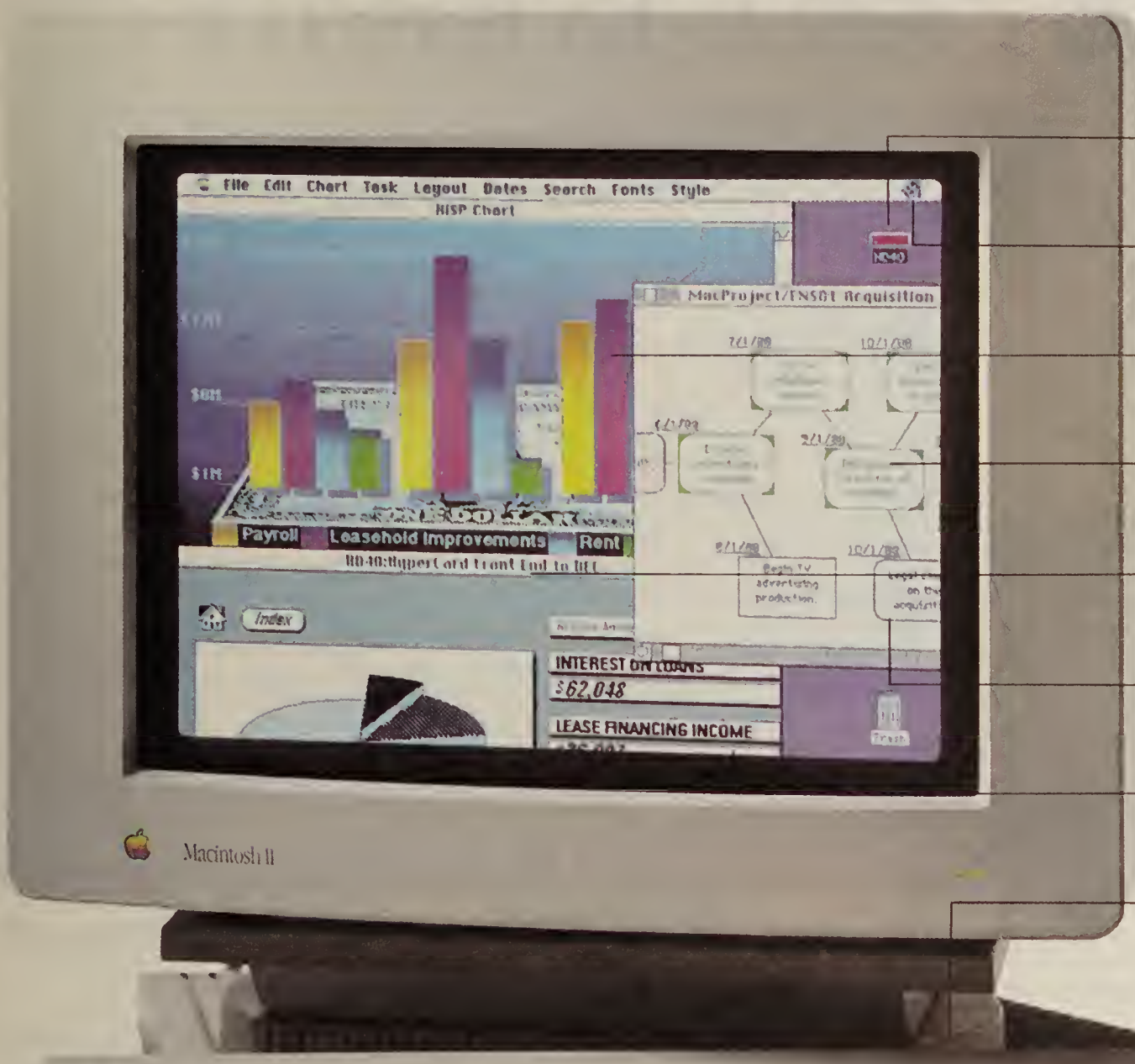
But we hasten to add that there's more to business than simply meeting standards. Which is why we've put so much effort into exceeding them.

Macintosh II is not only a Macintosh, it's an entirely new generation of computer, complete with an operating system that exploits every bit of its power.

The latest part of that system, MultiFinder,™ builds upon the graphical point-and-

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# Then, we raised them.




***Graphical Interface.*** *We pioneered the intuitive graphics-based operating system that others are only beginning to imitate.*

***Multitasking.*** *It's a fact, not a promise. Our MultiFinder lets you run multiple programs simultaneously.*

***True WYSIWYG.*** *As in "what you see is what you get." Go from screen to printer without the element of suspense.*

***Integration.*** *Cut and paste text and graphics between programs, even those from different software companies.*

***HyperCard.™*** *A revolutionary way to customize your office's information—by using associations instead of commands.*

***Applications.*** *Second-generation programs to help in every area of business use. Not next year. Today.*

***Transparent Access.*** *Taps into all your computers, from PC to mainframe, in the same intuitive Macintosh way.*

***NuBus™ Technology.*** *Unlike other computers, Macintosh II has 32-bit expansion slots based on a published architecture—so future development is uninhibited.*



click interface we pioneered with Macintosh. It allows you to switch effortlessly between applications, or do a number of things at once.

This higher standard leads to a new world of possibilities. For example, you can now use advanced programs for Apple® Desktop Publishing—the standard we created over two years back—right alongside your business programs. So it's much easier to integrate different efforts into a single document.

In the Macintosh tradition, what you see on screen is exactly what you can expect on paper. And every program works very much the same way, helping to cut training costs drastically.

The best part is, this technology lets you raise the basic standard of how you get your information. Because now you can access all your computers (including mainframes) in the same intuitive Macintosh way.

But rather than read about it, why not be an eyewitness.

Call 800-446-3000, ext. 300, for the name of a nearby authorized Apple dealer, and examine the whole family of Macintosh computers and LaserWriter® II printers.

You'll find that Macintosh II makes a very good place to start, since it lets you add so many options down the road.

Except, of course, the warm feeling of security. That comes standard.

The power to be your best.™

*trademark of WordPerfect Corp. Lotus and 1-2-3 are trademarks of Lotus Development Corp. Ethernet is a registered trademark of Xerox Corp. NuBus is a trademark of Texas Instruments. Macintosh II comes with a CPU (which isn't shown here) and a mouse (which is). For the sake of custom configuration, monitor and keyboard are purchased separately. As are your desk, chair, trash can and pencil cup.*



# IF THE PRICE IS RIGHT

BY ED SCANNELL

The bottom line on what drives corporate purchasing decisions continues to be the bottom line.

While reliability and level of compatibility are the top considerations, pricing is often the determining factor in whether both Fortune 1,000 corporations and non-Fortune companies buy hardware or software, according to a study of 443 sites conducted by Focus Research Systems, Inc. for *Computerworld*. All participants had at least 100 microcomputers at their locations.

According to the survey, 180 respondents from Fortune 1,000 companies expected to pay no more than 65% of the retail price for hardware products and 63.5% for software products. Non-Fortune companies felt about the same; they expected to pay no more than 64% of list price for hardware and 63.1% for software products.

"We are influenced mostly [in a purchasing decision] by cost and reliability," says Richard Pence, manager of information systems for General Electric Co. in Salem, Va., summing up the attitude of several other respondents interviewed. "The name of the vendor rarely thrills us."

Not even if that vendor's name is IBM?

"Especially that one," quips Pence, who actually has about 120 IBM Personal Computer ATs among the 350 or so microcomputers at his site.

With an average of 416 PCs per site, the Fortune companies, overall, spent 13.8% of their information systems budgets on microcomputers. These percentages jumped among non-Fortune respondents. The average number of PCs installed at those sites was 494; 20.7% of the non-Fortune group's information systems budgets was spent on micros.

Surprisingly, both categories of companies planned to buy fewer PCs this year than last. On the average, Fortune companies planned to buy 111 PCs in 1988, compared with 144 last year; non-Fortune companies planned to buy 105 PCs this year, compared with 134 in 1987.

### Proof's in the price

Though they are concerned with price, many more Fortune 1,000 respondents purchased their PC products through retail stores and direct from vendors rather than from traditionally less expensive mail-order houses. Retailers were the preferred supplier of 44.6% of the Fortune respondents, while about 28% of the group preferred to buy direct from the vendor.

About 43% of the non-Fortune respondents preferred buying primarily from the manufacturer, with only 30.7% of that group preferring to buy from retailers.

While mail-order companies tend to offer significantly lower prices, the study showed that only 2.8% of the Fortune respondents said they bought products primarily from these sources. Note, however, that 15% said they do use mail order for some hardware purchases, and 23.3% did so for software purchases. These numbers rose by a fraction among non-Fortune companies.

Value-added resellers (VAR), on the other hand, are the predominant PC product supplier for 16.9% of the Fortune group, but only 13.2% of non-Fortune groups preferred to buy their products from VARs.

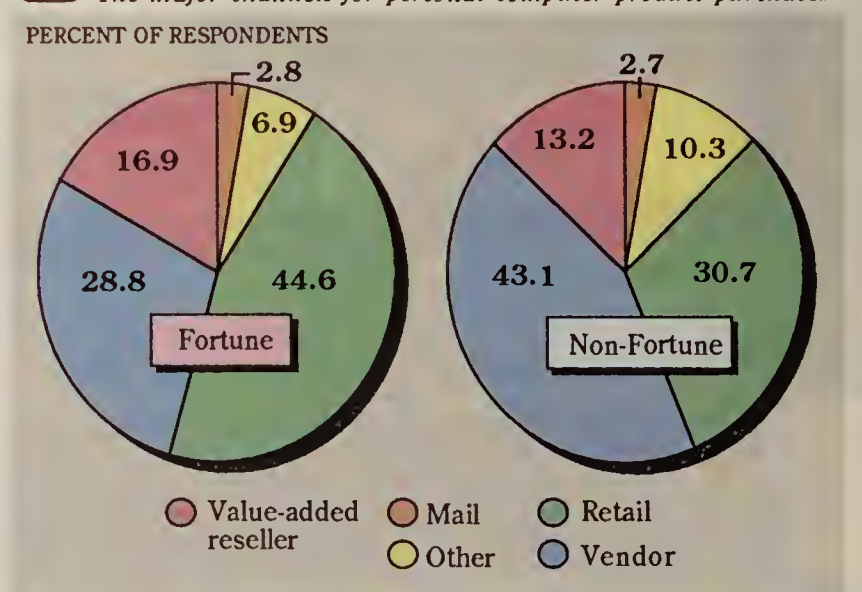
Corporate buyers purchasing most products through dealers said they did so because they received attractive volume discounts. A bit surprisingly, however, they said they didn't do so

*Continued on page SR/28*

Scannell is a *Computerworld* senior editor, microcomputing.

## Where corporations buy

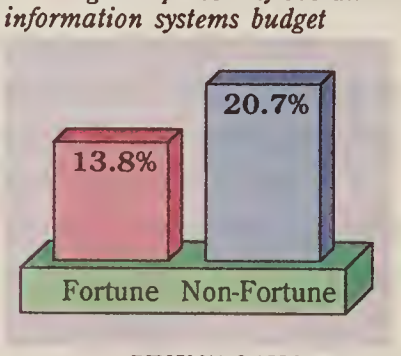
*The major channels for personal computer product purchases*




INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.
CW CHART

## How much is enough?

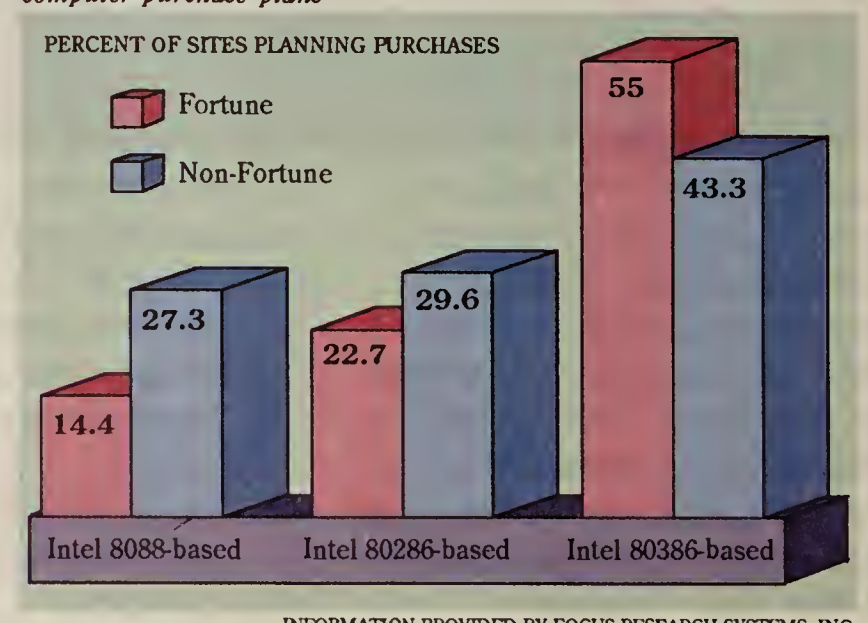
*PC budget as percent of overall information systems budget*




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## IBM-compatible acquisitions

*Machines based on the 80386 processor top personal computer purchase plans*




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# THE DESKTOP COMPUTER FOR PEOPLE WHOSE MINDS ARE AT WORK EVEN WHEN THEIR BODIES AREN'T.



**Presenting the PowerMate™ Portable. Desktop power to go.™**

If you happen to be one of those rare individuals whose minds don't punch out at five o'clock, we have some good news for you.

It's called the PowerMate Portable. And thanks to some workaholic engineers at NEC, this nifty little dynamo is everything a desktop computer is.

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*Take it to the limit.*

NEC

For the name of the dealer nearest you, call 1-800-343-4418. In Canada, call 1-800-387-4313. NEC Information Systems, Dept. 1610, 1414 Massachusetts Ave., Boxborough, MA 01719.

C&C Computers and Communications

# The best way to leap through next Monday




*IBM OS/2 will bring superb graphic and multi-tasking capabilities to the PS/2 as shown here.†*

# years ahead and get at the same time.

Every business person worth his or her salt knows you have to prepare for the future. They also know the only way to get to the future is by getting a grip on business now.

That is precisely the point of the IBM® Personal System/2® family.

In fact, the real beauty of the PS/2® design is that it has enabled us to satisfy many of your immediate needs, while still focusing on the bigger picture.

## For improving performance, there's no time like the present.

The PS/2 was designed to bring advanced technology to your desk now.

It runs DOS applications you're running now, like Lotus® 1-2-3® spreadsheet and DisplayWrite™ 4 word processing program.

And it runs them faster—from 117% to more than 850% faster, in tested applications,* depending on the model you choose.

The PS/2 family also gives you more standard features than other systems.

In fact, graphics, along with communication, printer, and pointing device ports, are built right in. That can save you money later on. And it gives you the convenience you'll need in the future. Right now.

All of those features were designed to satisfy your present need for power and graphics. And they do. Which is why the Personal System/2 family is selling faster than any computers in history.

But satisfying your current needs was only part of the plan.

The PS/2 was also intended to offer you an entirely new way of protecting the life of your investment.

## IBM puts the future of computing in your hands.

If the IBM PS/2 is the best way to get a handle on business today, the PS/2 combined with the IBM Operating System/2™ program could completely redefine your ideas about computing in the future.

In fact, we at IBM believe OS/2™ *is* the future of personal computing.

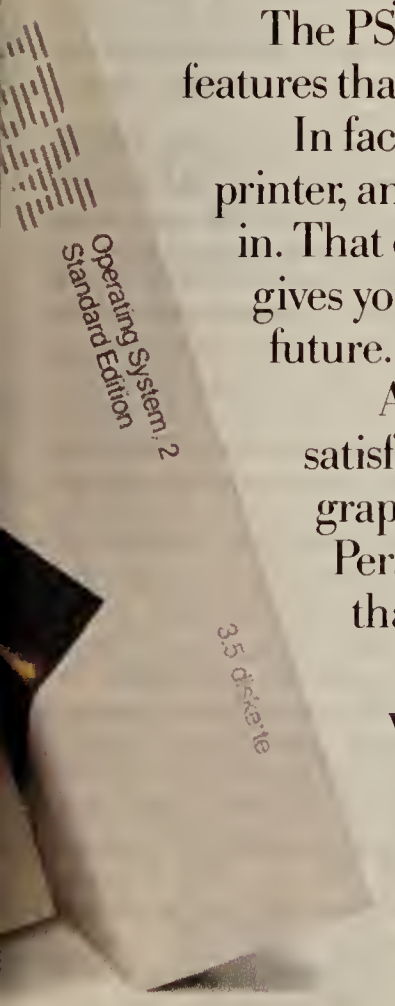
OS/2 (together with our models employing PS/2 Micro Channel™ architecture) boosts productivity levels even higher—up to 65% over DOS. It manages large memory to run several jobs at once, including multiple spreadsheets.

OS/2 also ensures that you'll always be able to run DOS-based programs.

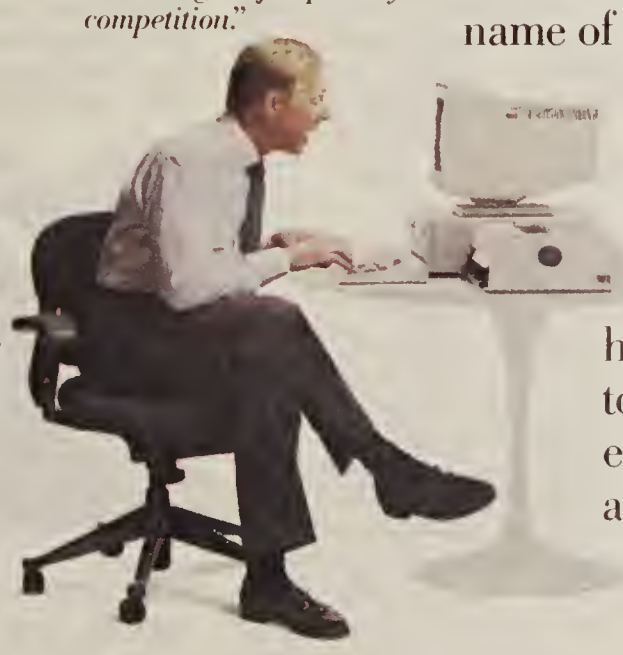
And, even more important, it has impressed software manufacturers enough for them to invest their time and resources, developing many new applications to take advantage of the power of OS/2.

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Learn more about the IBM PS/2 and OS/2. And learn how to make your day-to-day operation more efficient while keeping a close eye on the bigger picture.




*"Now I've got a jump on my competition."*



IBM

# The Bigger Picture

Visit IBM in Booth 1040.

*Based on performance test results published in the April, 1987 and January, 1988 issues of *PC Digest*, comparing the PS/2 Models 30, 50, 60 and 80 to the IBM PC XT, running Lotus 1-2-3 and DisplayWrite 4. †This simulated screen shown was developed using the IBM Storyboard Plus program. IBM, Personal System/2 and PS/2 are registered trademarks; PC XT, Operating System/2, OS/2, Micro Channel and DisplayWrite are trademarks of IBM Corporation. Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation. ©IBM 1988.

# Price

FROM PAGE SR/24

to receive support.

Many believed they could better support users through their own MIS departments than any other channel, including dealers.

"We buy through local retailers such as Computerland and Entre, but we don't depend on them for support," says Miles Ashley, information center manager for Bank One Corp. in Indianapolis. "In my mainframe days," he adds, "I remember when IBM gave great technical support. But in the PC world, it just isn't there. I don't care who the vendor is."

One manager insists that his users refer all problems to MIS and not to vendors, because he can better distribute information about a particular problem to all users.

"If [users] call us, then we can get the word out to all users," says Greg Bryant, manager of information systems at Signet Bank Corp. in Baltimore. "Individual users getting an answer from the vendor may not tell everyone else."

Lack of support is one reason Ashley and two other MIS executives interviewed were somewhat reluctant to purchase large numbers of IBM's Personal System/2 series, which contains the semi-mysterious Micro Channel architecture. Most say they are unwilling to experiment with a product they cannot adequately support.

### Waiting game

Although 45.9% of the Fortune respondents and 34.6% of the non-Fortune group said they were satisfied with the PS/2's technical capabilities, some will put off large purchases until a rich selection of OS/2-compatible applications appears.

"I'm still sitting on the fence," Signet Bank's Bryant says. "The software developers will decide whether OS/2 works or not. It was the same thing with CP/M and DOS."

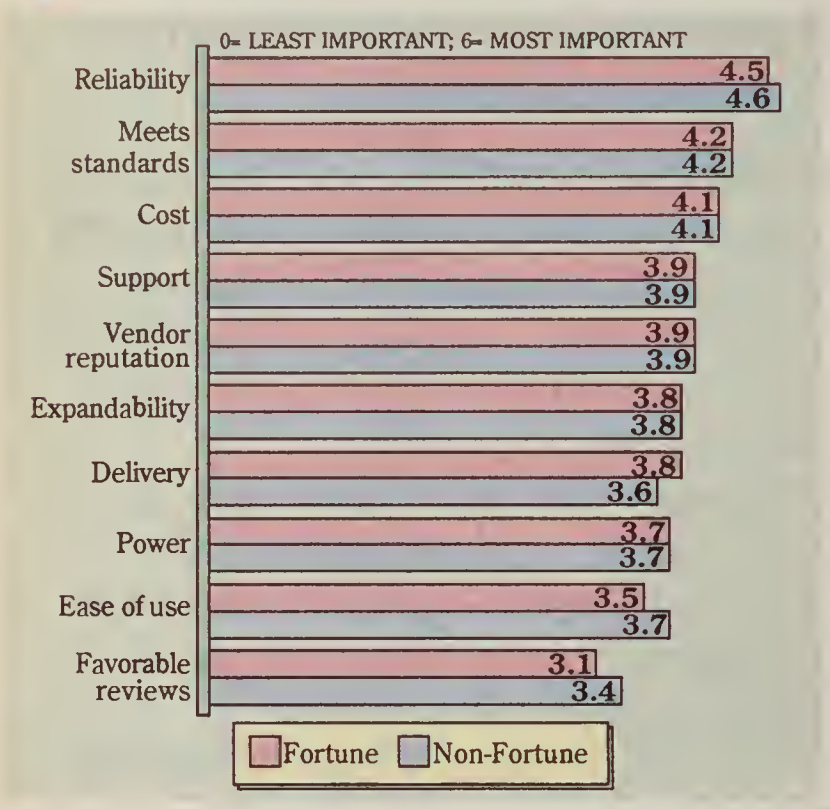
Fortune accounts had a clear preference for superior processing power. Of that group, 55% said they planned to buy Intel Corp. 80386-based systems, while only 14.4% said they would buy Intel 8088-based machines.

Non-Fortune companies also preferred 80386s over 8088s, with 43% saying they planned to buy the high-end machine and 27% planning to buy the 8088s in the upcoming year.

Almost two-thirds of the Fortune respondents said they would replace an old PC with a new one; 38% said they would rather upgrade with add-in boards. Of the non-Fortune companies, 57% indicated they would replace their old systems with a new one, while 42% said they would use upgrade boards to accomplish the task.

## Under the influence

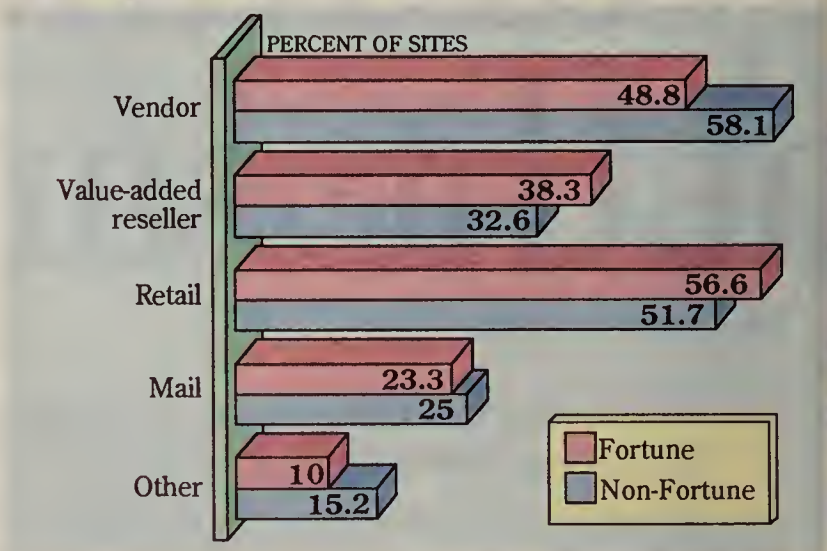
*Factors influencing personal computer product purchases*




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## Where they buy

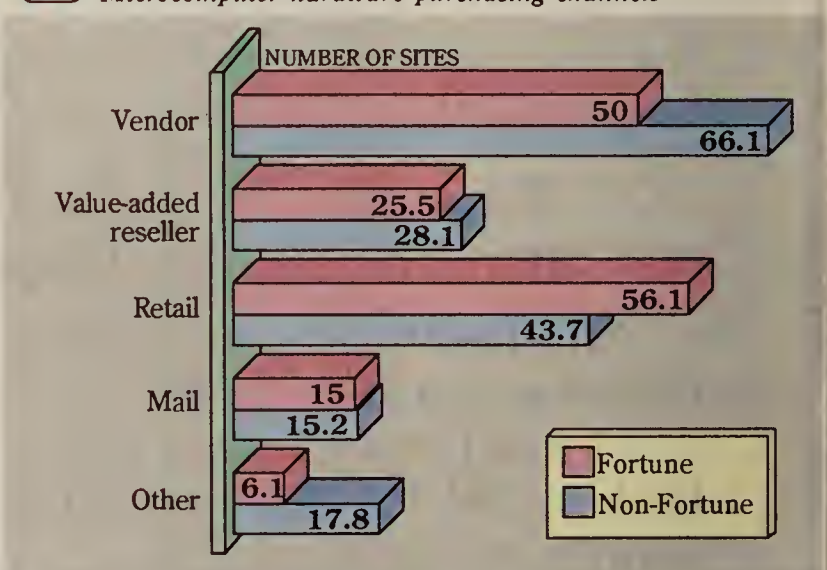
*Respondents use multiple microcomputer software purchasing channels*




INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.

## Going shopping

*Microcomputer hardware purchasing channels*




INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC

# Dell snips away at its mail-order roots

BY BARBARA SEHR

Asking Michael Dell when he started in the mail-order business is like asking George Bush when he coined the term "voodoo economics." Both got noticed, but neither wants to be remembered by his roots.

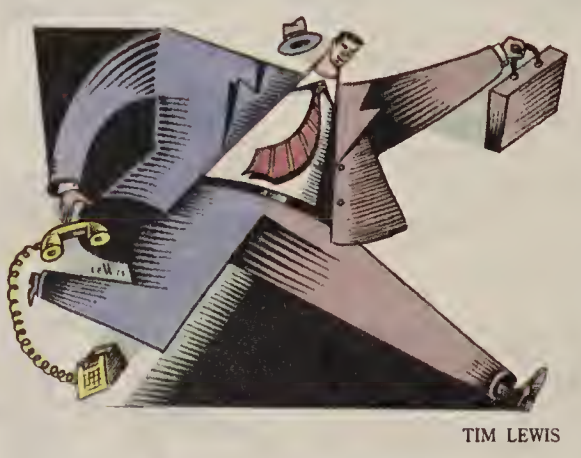
Selling computers by mail put Michael Dell of Dell Computer Corp. on the map in 1984. His company, then named PC's Limited, sold hardware manufactured by others and eventually began to assemble its own brand of machines.

"We'd sell to anyone who would buy through our magazine ads," recalls Dell, the company's founder and chief executive officer.

In its brief life span, Dell became the "pre-eminent personal computer mail-order distributor in the U.S." says Bruce Stephen, senior PC analyst at International Data Corp. (IDC), a Framingham, Mass., market research firm. But Dell squirms at the term "mail-order," sensing its frequent association with reduced or nonexistent support and low prices.

And it would be very hard to describe today's Dell as a mail-order house. Computers are still shipped from a central warehouse at the company's headquarters in Austin, Texas, in response to customer orders, but the similarity begins to diminish from there.

The company offers a 30-day money-back guarantee of total satisfaction to its customers. It has arranged for a national network of service through Honeywell-Bull, Inc., including a one-year on-site service contract included in the purchase price.



TIM LEWIS

More important, in the past year, the company has begun to turn its focus away from sales to individuals in order to stake a claim to the crowded but profitable direct sales and value-added reseller (VAR) markets that serve educational institutions and Fortune 500 clients.

Dell has brought in new corporate management and PC industry veterans to enhance its image, as well. Bobby Inman, former head of Microelectronics and Computer Technology Corp., now sits on the company's board of directors, and the former vice-president of Tandy Corp.'s Radio Shack Business Products Division, Graham Beachum, is now Dell's senior vice-president of sales and marketing.

In addition, the company's advertisements have come a long way from the typical price-cluttered mail-order ad to image advertising prepared by the likes of Hal Riney & Partners, who created the Bartles & James wine cooler campaign for Gallo.

The moves are apparently paying off. The firm ranked 11th among manufacturers of IBM-compatible PCs, a 1987 IDC survey showed . Its sales have doubled each year that it has been in business.

Dell reported fiscal year 1988 sales at $159 million, up from $69 million in 1987. However, "last year was a particularly good year for all IBM-compatible manufacturers," IDC's Stephen says. "While 1988 will show increases, they won't be near the levels of 1987." Despite such predictions, Dell says he is confident that the company's spectacular growth will continue.

Among its expanded areas of distribution is the VAR market, for which Dell has created its own division. Stephen calls the move "a necessary step" if Dell wants to move into such a class as cross-Texas rivals Compaq Computer Corp. and Tandy.

A key factor in Dell's profitability has been its assembly-to-order manufacturing process, in which systems are not assembled until they are ordered. This also means customers get a system specific to their needs.

Dell's future focus will be on enhancing the capabilities of the PC's Limited line in its continuing competition against IBM and other clone makers. Dell says he remembers a time when he considered becoming a VAR for the IBM Personal Computer itself, but he rejected the opportunity.

"The growth potential and the profit potential was not nearly as large as the one we're involved in," he says. •

Sehr is a free-lance writer based in Seattle.

# THE NEW SUN WORKSTATION IS ALREADY POSTING SOME IMPRESSIVE NUMBERS.

On April 7, Sun Microsystems* introduced the world's first workstation that uses the full power of the Intel386™ computing engine.

The Sun386i.*

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The 386™ microprocessor was specifically designed to support workstations like this. With its advanced architecture, the 386 chip lets the Sun system run UNIX* and DOS applications at the same time. At full speed.

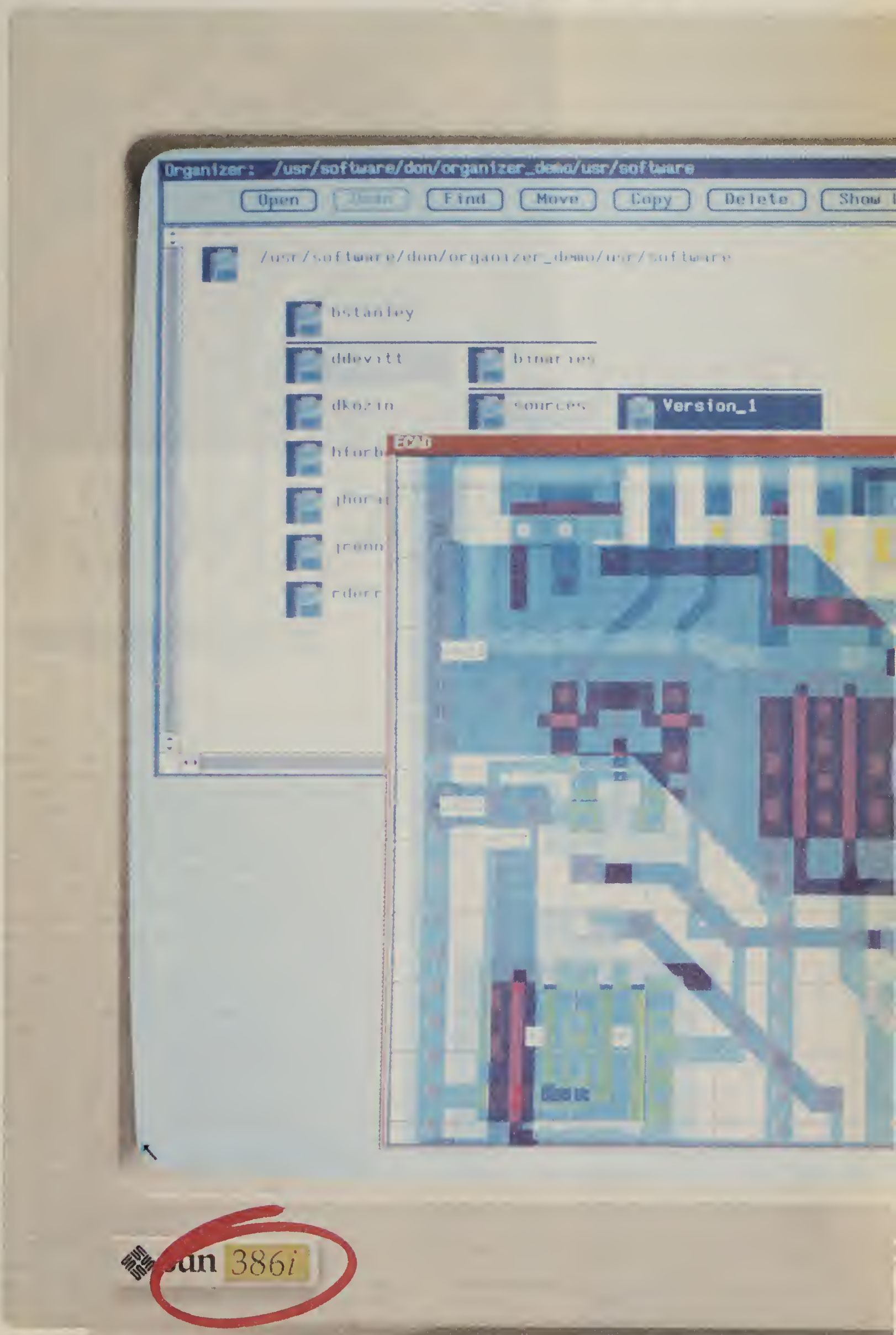
And we mean full speed. The Sun386i can run at 13,000 Dhrystones/second. Besides our 386 chip, Sun gave its workstation the full performance boost delivered by the complete Intel386™ computing engine: the 387 numerics coprocessor, 385 cache memory controller, and 380 direct memory access chip. The result is almost twice the performance of Sun's previous workstations.

Of course, the business benefits that Sun's workstation delivers are just as impressive. It lets users take advantage of applications running under SunOS™ as well as thousands of other standard UNIX and DOS software programs. As a result, Sun can offer its customers all the benefits of cutting-edge technology. With none of the risk.

So if you'd like to know how the 386 microprocessor can make the performance of your next design even more impressive, just call (800) 548-4725 and ask for Literature Dept. W447.

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CAROL O'MALIA

# THE MAINTENANCE BLUES

BY MICHAEL BALL

What three words strike fear into the information center manager's heart? Personal computer maintenance.

From coffee spilled on the keyboard to blown hard drives and chips, PC hardware support is a fact of life in corporate America. But not all companies maintain their PC hardware in the same manner. While some firms swear by all-encompassing PC service contracts, others make do with in-house support and pay-as-you-go repairs.

*Computerworld* talked with administrators at several companies to examine the ins and outs of PC hardware maintenance.

### Going with a contract

Having to administer a large number of PCs is perhaps the most compelling reason for purchasing a maintenance contract.

---

Ball is a free-lance writer based in Boston.

For example, Continental Illinois National Bank & Trust Co. in Chicago contracts for its 1,200 units, which are mostly Compaq Computer Corp. machines and IBM Personal Computers.

"We've never seriously considered doing it in-house," says Peg Delaney, information center manager. She adds that self-service maintenance would be impractical financially. The bank views the extra staff and inventory as prohibitively wasteful.

In search of the best possible situation, the bank reconsiders its service contracts annually. In 1986, it paid a third-party service company a per-machine retainer, plus time and materials up to an annual corporate cap. In its latest contract, it pays a flat quarterly fee per machine. The bank is reassessing its current service contract.

Continental Illinois is very mindful of the cost/benefit analysis of maintenance. The company's annual review of PC service led it to drop IBM as its service supplier nearly four years ago.

Since going to third parties, Continental has not been tempted back to any vendor. "We receive bids every year," Delaney says. "So far, no vendor has been close to the third-party prices."

A bigger company with a smaller number of PCs has a similar attitude — but with different effect. In Purchase, N.Y., Pepsico, Inc. turns to a vendor for a service contract. Businessland, Inc. maintains the 300 PCs located at Pepsico's corporate headquarters.

Pepsico is a large, steady customer and uses its volume business to help ensure that the vendor gives prompt service at a good price, says Liz Menten, manager of the company's information center. Pepsico's departments are not required to buy PCs from Businessland, but many do. Under the contract, the retailer must service all of Pepsico's Microsoft Corp. MS-DOS PCs, even those bought elsewhere.

Like virtually all users contacted, Menten says her company takes advantage of any manufacturer or vendor warranty but does not accept the added cost of bundled service contracts. Still, she adds that the corporate attitude is similar in its effect. "We

tend to think of the service as bundled with" the PCs, she says.

Pepsico once used a different service company but shopped around because it was too expensive. And the company continues to evaluate its service options. "We haven't rejected in-house support," Menten says, "but we would have to find the right service and price."

Currently, however, Pepsico sees no economic reason to bring service in-house. "We don't want to do our own," Menten says. "The turnover [in maintenance staff] is terrible, and the cost of training is very high."

In addition, the recent improvements in chip and board densities reinforce her view that outside service is necessary. She cites the Intel Corp. 8080-based machines, which "have run through their life cycle. They had numerous small, inexpensive parts that could be identified and replaced. . . . But with the PS/2 Model 50s — it's scary," she says. "It's like a car. You used to be able to do your own tune-up, but now you open the hood and can't even find the spark plugs."

These new products' high-performance boards are hard to troubleshoot and expensive. Pepsico's conviction is that replacing a major component in a PC or laser printer often costs nearly as much as buying a new unit. While the day of the disposable PC is not here yet, that may be the effect in individual cases.



Continental's Delaney

### Pay as you go

Do-it-yourselfers have similarly compelling reasons for their choice. They also perform cost/benefit analyses, but they ultimately decide against contracting for service. Even in companies that would not dream of having minis or mainframes without maintenance and service, the time-and-materials-only credo seems to hold.

In Branford, Conn., Echlin, Inc. has 53 PCs, one in-house diagnostician and a deal with a local Computerland. The manufacturer of turbochargers and other automotive parts sees its setup as the most cost-effective arrangement.

"We look at this as a time and materials issue; we've done studies on this and found we paid $9,600 for maintenance last year," says Richard Hock, Echlin's director of MIS. "We can't come close to that on a contract."

For PCs, the staff troubleshooter, Al Guimares — who is also operations supervisor for Echlin's PC network — diagnoses problems and fixes those he can. Board and drive swaps are typically performed in the computer room. Computerland handles those problems that Guimares is unable to diagnose or fix.

Like Pepsico, Echlin has examined numerous vendor and third-party service sources and expects to continue to do so. In the five years the company has had PCs, it has looked for contractors at least three times. Last year, it considered Control Data Corp. and GE Information Services, a division of General Electric Co. Echlin found both to be too expensive. "Every time we have checked, we [found we] can do it more efficiently for less," Hock says.

As its system grew, the company augmented its original IBM PCs with Compaq machines and eight Intel 80386-based machines. As did other PC users, Echlin examined and passed over IBM's service. The vendor's attitude, Hock says, seems to be that it does not want to service a mixed-vendor environment, particularly of PCs. IBM "doesn't want to get involved. Since they heard we were going to a [multivendor] PC system, they haven't called."

A similar cost-consciousness led the Federal Reserve Bank in Chicago to use third-party service for its IBM Personal System/2 and older MS-DOS machines, says Dave Smith, consultant for the information resource center. He adds that Federal Reserve has a policy of not necessarily buying maintenance contracts and encourages shopping around for pay-as-you-go service.



Pepsico's Menten

Smith notes that as PC prices have dropped, their reliability has increased dramatically. "We find that most maintenance is minimal," he says. "We will replace a hard drive ourselves, but we do not fix it.

"We do time and materials strictly," Smith adds. "It does not cost anywhere near what a contract would."

His group looked at all the costs associated with pay-as-you-go service and maintenance and did not find real differences between vendors and independents. So, as much as any factor, the speed with which a company responds and the length of time it takes to do the job make the decision for Smith. Federal Reserve uses two companies in Chicago, both of which do nearly same-day service.

Indeed, the cost of service is not always the top concern. "Time is the No. 1 consideration, not price," says Cindy Thames, vice-president of The Technology Research Group in Boston. Her company has a rather sophisticated Apple Computer, Inc. Macintosh-MS-DOS microcomputer network with shared peripherals. It has only a dozen PCs, however, and can't afford to lose one during a business day.

Like many small users, the firm relies on staffers with a mechanical or electronic bent to perform routine maintenance and repairs. "We have several people willing to mess with them," Thames says. "If something is obviously broken, like a Mac disk drive that ate disks or the Laserwriter doing something funny, we get someone in to fix it."

That someone is sometimes a local vendor of PCs or peripherals. At other times, particularly with something in short supply like Mac parts, "I call companies from the yellow pages and hire the one who can do it the fastest," Thames says. "I found one who for $50 or $100 will make a house call and fix it the same day."

Even with such a small, mixed shop, the company gets calls and letters from service contractors. "A lot come around, but they are all too expensive," Thames says.

Vendors seeking The Technology Research Group's business would have to offer more than a low price, though, Thames adds. "First, we would consider a contract if things broke down a lot," she says. "But it would have to be with a company that has fast turnaround or loaners. We would pay for someone who could take the whole headache out of maintenance and repair."

### Contracts — who needs 'em?

Those same concerns have been approached from another angle by a user who has only a handful of PCs. Cox Cable Greater Hartford, Inc. has long used contracts for its large systems and started out with a similar service for the few PCs in its main office.

"It wasn't worthwhile to keep [those contracts]," says Gary Perrelli, company controller and systems aficionado.

Perrelli says that he, too, finds the reliability of new MS-DOS equipment so high that contracts are unnecessary. During the warranty period for Cox's equipment, there were no problems that required service calls.

"At this point, we don't see any need to look at third-party support, and we wouldn't unless we got hundreds of PCs," Perrelli says.

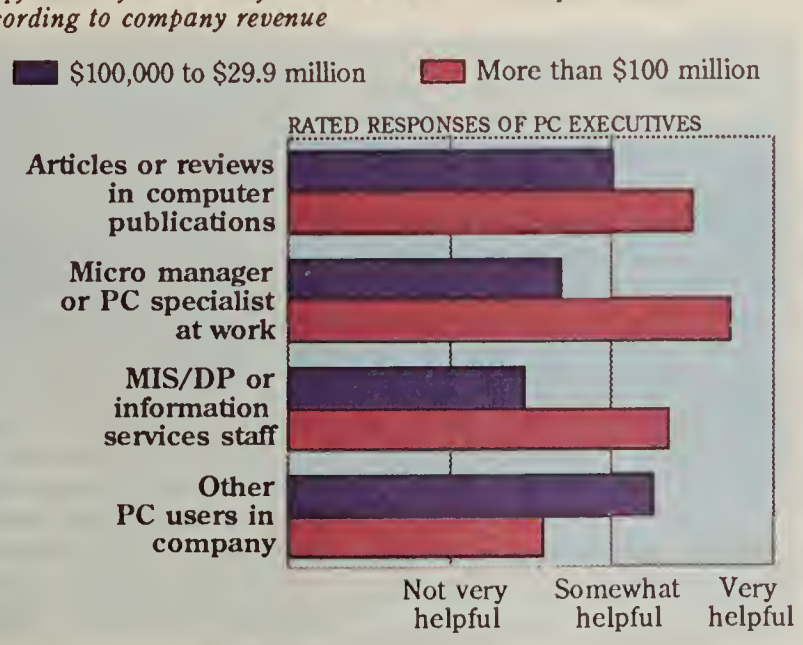
At some point, the PC aftermarket may well catch up to the users, as it did in disk quality and price and as it has with consumer electronics. Until then, many customers who do not have armadas of PCs seem content to gamble a little to save a lot. Particularly when repair costs approach replacement costs, service contracts seem prohibitive to many.

Whether companies go with contracts or not, it seems everyone is keeping an eye on the service industry. Most companies report constant reviews of their options and the players. No one reports finding the optimal permanent solution to PC maintenance.

"Sure, there are things we don't know about maintenance," Hock says, "but it hasn't been a problem. We get by quite well." •

## Who do they turn to?

*Helpfulness of selected information sources in PC purchase decisions according to company revenue*




INFORMATION PROVIDED BY AN INTERNATIONAL DATA CORP./STAT RESOURCES NATIONAL SURVEY OF PERSONAL COMPUTING IN U.S. BUSINESS
CW CHART

## It's mostly a family affair

When it comes to software questions, most users are content to consult in-house advisers or make a toll-free call. Even so, complex questions do arise, and companies find their answers in different ways.

Perhaps the most elaborate type of internal service is the call- or walk-in center, like the PC store at Chicago-based Continental Illinois National Bank. Since 1984, the staff has undertaken direct or telephone troubleshooting for the company's micros. Today, there are 1,200 PCs and more than twice that number of users. A rotating group of three people from the end-user support department staffs the store.

"We do have corporate arrangements with some software vendors," says Peg Delaney, the bank's information center manager, "but nearly everything else we can handle ourselves."

Another set of considerations comes into play at automotive parts manufacturer Echlin, Inc. in Branford, Conn. The company writes all of its PC applications in PC/Focus from Information Builders, Inc. It also has a full complement of purchased productivity tools.

According to Richard Hock, Echlin's director of MIS, virtually all of the applications maintenance and troubleshooting falls to internal MIS staff. Purchased programs do present extra problems, but, Hock says, company policy has minimized them. "We didn't proliferate PCs," he explains, so there are few beginners. In addition, Echlin mandates the use of standard software products.

The problems of learning the advanced features of standard packages generates most of the service calls at Pepsico, Inc. in Purchase, N.Y. There, says Liz Menten, manager of the information center, it is typically printer software that creates queries. "It is understanding how to use the features, not real problems," Menten says.

Pepsico prefers its PC users to have access to the full range of telephone support. Like Echlin, it encourages users to buy from a list of standard packages, then provides them with vendor, distributor and internal support phone numbers.

A final way that companies provide PC support is to designate a PC guru. The problem is that the work often comes in spurts — sometimes there aren't enough calls to keep the expert busy, and other times he's overworked.

MICHAEL BALL

# TIPS FOR THE LAN WEARY

BY JAMES Y. BRYCE

MIS, be warned: Step gingerly and carry a big list if you're about to power up a new personal computer network. While PC-based local-area networks have much to offer, they should be installed with care to avoid costly and unnecessary mistakes.

*Computerworld* recently interviewed PC network administrators and experts, each of whom offered their observations on practical, working networks. Armed with the following valuable tips, you, too, can boldly go where many have gone before.

**Set up thorough training.** A well-implemented training program will save the PC network administrator from being deluged with service calls; it will also help users gain optimum performance by making clear the network's capabilities.



CRS Sirrine's Spain

Training can be accomplished either in-house, by the vendor or both. Del Poss, administrator of the Apple Computer, Inc. Macintosh network for the Department of Data Processing at the University of Texas at Austin, says, "Make sure your vendor can give you the training when you need it; build training into your specifications along with the other support."

In addition, the experts say, ongoing training for each employee is essential for a smooth-flowing network. Howie McCausland provides a multilevel approach to training. As Harvard University's network operations manager for arts and sciences, McCausland oversees the campuswide backbone network.

"We have short talks for the users, and this summer we'll have seminars on what we have, what we do and how to use it," McCausland explains.

**Design a simple user interface.** Once users understand the basics, the nuts and bolts of network manipulation should be hidden from day-to-day operation.

Syd Spain, research specialist and network administrator at Houston-based international architectural firm CRS Sirrine, Inc., says he advocates using menus to make network functions more visible.



Chapel Hill's Vogel

Ideally, a user should simply be able to turn on the machine, enter a logon name and password and immediately be able to see and select from a menu of applications.

"The user interface is important, particularly in an IBM Personal Computer environment, where there is no consistency like that of a Macintosh," says the University of Texas's Poss.

**Assign a network administrator.** Network administrators should be able to devote a significant amount of time to making sure the network is running properly.

For Harvard's large network, McCausland explains, the university "needs a central administrator to hand out addresses. Someone has to keep track of what's where."

In CRS Sirrine's network, administration becomes a full-time job, Spain points out. "We have divisional administrators and an overall administrator in MIS," he says.

In a small network of 10 to 20 workstations, network administration may be only a part-time job. In any case, the position requires coordinating equipment purchasing, maintenance, training, system configuration, application selection and day-to-day needs.

**Set up continued maintenance.** No matter what else happens, sometimes the hardware will fail, the cable system will have problems and the software will not do what it is supposed to.

Three maintenance alternatives are available, depending on the size of your network:

- **Do it yourself.** "Send your people to the technical schools and seminars and have them maintain it all," says Norm Vogel, director of communications research at the Department of Computer Science at the University of North Carolina at Chapel Hill and director of its PC network.
- **Use service contracts.** "One of the dominant constraints in planning a system is a uniform service agreement for the whole thing," says Ivan Frisch, professor of computer communications at the Polytechnical University of New York.
- **Pay as you go.** "Maintenance contracts are good, but the systems have proven so reliable that the cost-effectiveness of such contracts is questionable," CRS Sirrine's Spain says. You may want to try a combination of maintenance methods.



Polytechnical's Frisch

**Select and monitor application software.** "Selection of the application software should be one of the first things you do," Frisch says.

Application software must be compatible with the network operating system. In addition, experts say, be sure the applications are used effectively on the network. Policies should be set for software that must be used cooperatively to be effective. But beware of de facto standards in software; the product that is most widely accepted may not always be the best. In such cases, the University of Texas's Poss points out, "We support both the best and the standard."

**Prepare complete documentation.** "Document the cabling system, label the ends and maintain an on-line data base of the system," UNC's Vogel says. The need for documentation extends to every element — the cables, the software and the hardware. In addition to requiring full documentation for every vendor and installer, Poss augments what he gets. "We create our own documentation for applications so the users are not overburdened by the original vendor's documentation," he says.

**Plan for cabling costs.** If anything is overlooked in planning a LAN, it is cabling costs. While planning is important, Harvard's McCausland emphasizes that a cable purchasing budget that is too strict can cost more in the long run. "Resist the temptation to cut corners on things that will help later, such as patch panels and labeling," he stresses. "What looks like gold-plating can have substantial payoffs down the line."

**Coordinate backup.** "Backup has been the most difficult part of our system," says Melissa Freeman, network administrator at Baker & Price, PC, a law firm in Austin, Texas. "Be very sure that the backup equipment is 100% compatible with the network." In a LAN, backup responsibility must be carefully enforced. Some vendors, such as Novell, Inc., 3Com Corp. and Banyan Systems, Inc., have products that will back up remote and even mirror file servers so that a failure of one may be covered by its twin.

**Monitor and protect power levels.** "We protect against power failures with UPS equipment on the server, the administrator's workstation and the backup tape system," Freeman says. Monitoring products can even sense the loss of main power, advise all users that the system is switching to batteries, record everything in random-access memory and shut down the entire system. In a larger network, the integrity of the network system should be protected. The University of Texas's Poss says, "We are planning a token-ring backbone network. We'll probably use battery backups on the ring repeaters." •

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Bryce lectures, conducts seminars and writes on computing, high technology and the effects of technology on society.

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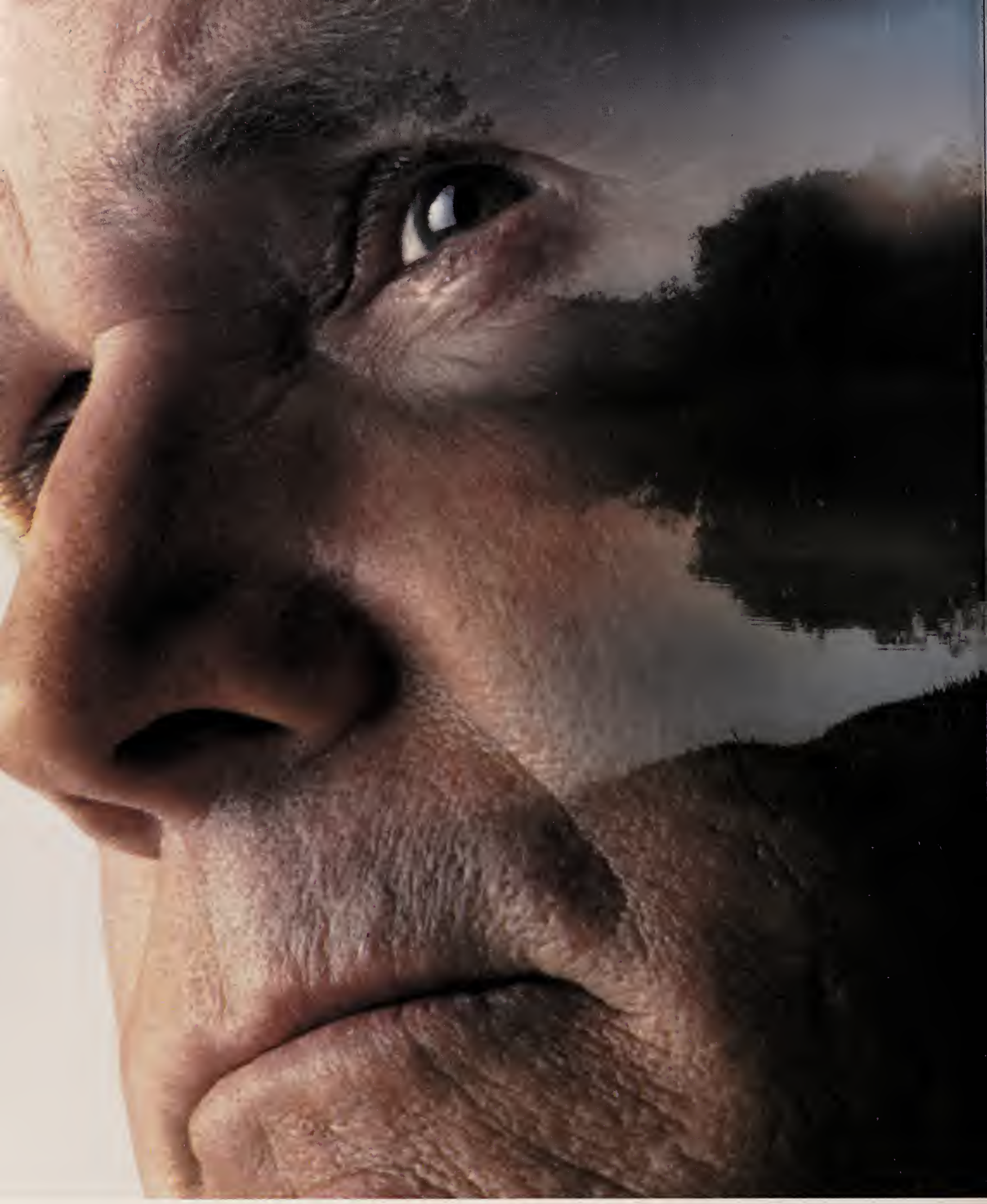
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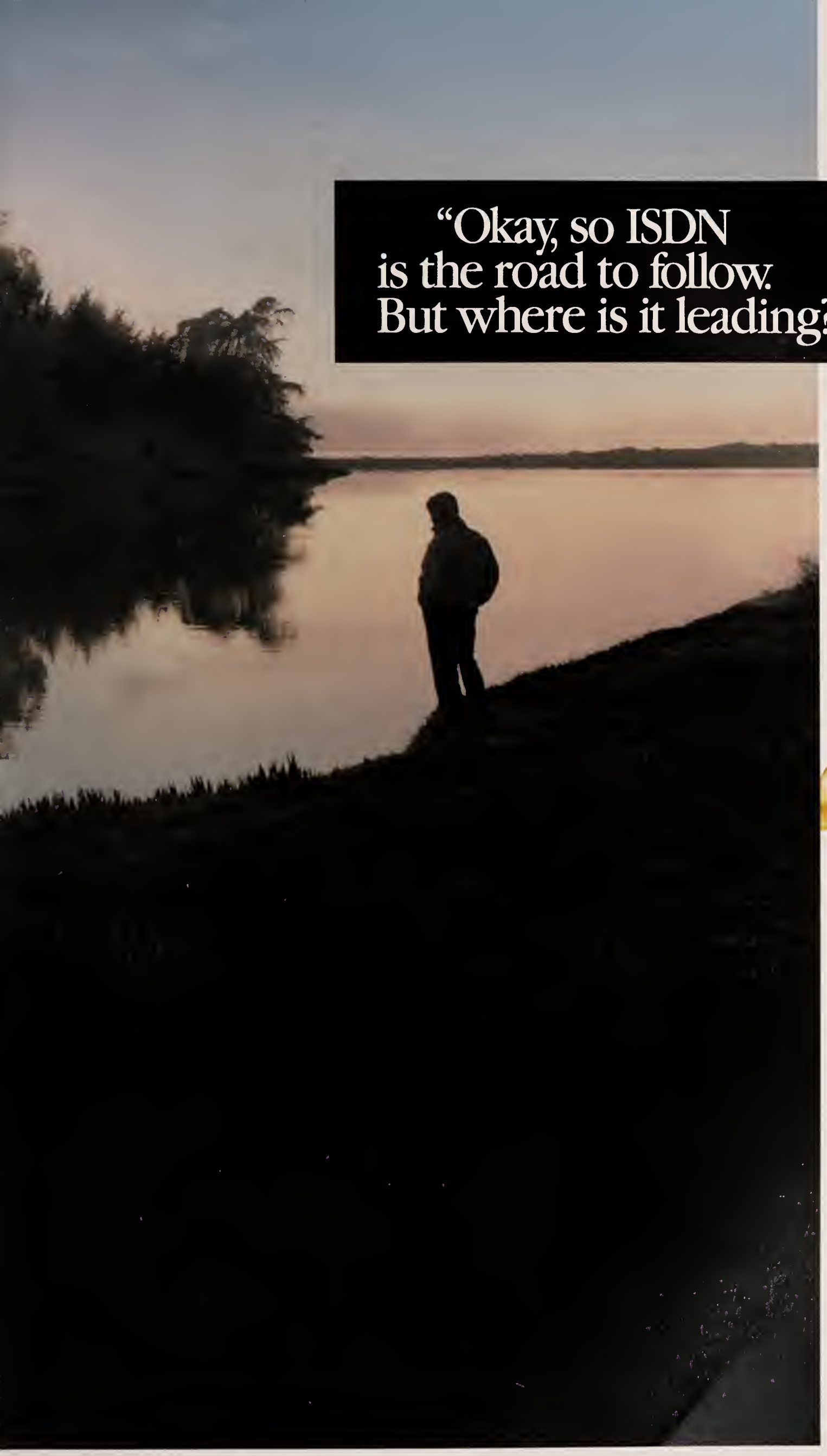
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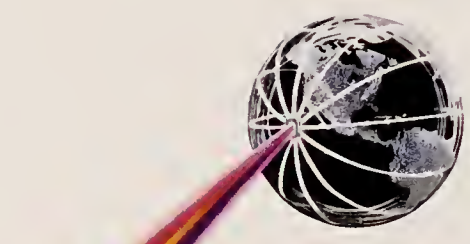
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DATA STREAM

*Clare Fleig*

# IBM strategy ups the ante



IBM has launched an all-out attack on the telecommunications market segment with a three-pronged strategy focusing on acquisition, alliance and accommodation.

The strategy, which has been actively touted by IBM only recently, is a marked change from its earlier efforts to internally develop and market telecommunications-oriented equipment and applications.

But unlike many of those earlier efforts — including partnerships with MCI Communications and Satellite Business Systems, IBM's failed European-based private branch exchange (PBX) Carnation line and initial losses stemming from the Rolm acquisition — IBM has a real chance of succeeding this time around. This is because both the environment and IBM's way of addressing it have changed.

**Full plate**

IBM has shifted its view of telecommunications from something seen as a separate business opportunity that would be nice to have a piece of to a platform for

*Continued on page 68*

# DCA sketches out 10Net plans

*Aims to use division as vehicle for drive into networking market*

During the past year, local-area network companies have become hotter than a ticket to a Bruce Springsteen concert. With research firms like International Data Corp. predicting that LAN installations will increase by 125% by 1992, the purchase of a LAN firm may seem like a quick and easy entry into a gold mine.



10Net's Goodall



DCA's Ottinger

Last August, communications products maker Digital Communications Associates, Inc. (DCA) scored when it merged with Fox Research, Inc., a low-end LAN gear maker it subsequently renamed 10Net Communications. Recently, *Computerworld* staff writer James Daly talked with 10Net President Gregg Goodall and DCA President Jim Ottinger about the changes that have occurred at the two firms during the past eight months.

**Eight months after your merger, what changes should users be seeing?**

*Goodall*: We've increased our [efforts] in the domestic marketplace ... determining where our products best fit in penetrating those market opportunities. We've created quite a bit of awareness and sales for 10Net products.

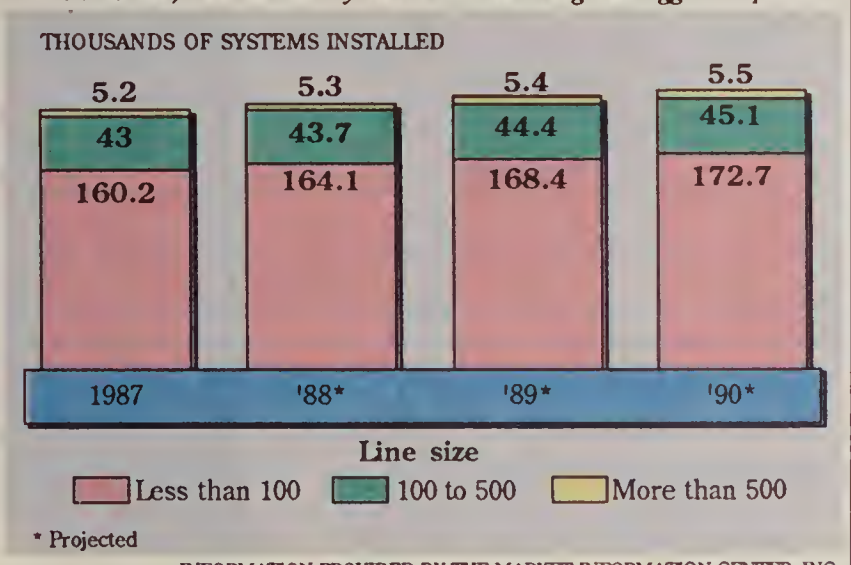
*Ottinger*: In the past, we've always had a lot of questions about what we are doing about local-

*Continued on page 67*

## Data View

PBXs keep climbing

*While the U.S. market for private branch exchanges continues its ascent, the smallest systems will be taking the biggest steps*




INFORMATION PROVIDED BY THE MARKET INFORMATION CENTER, INC.
CW CHART

# Btrieve revs SQL engine

BY PATRICIA KEEFE
CW STAFF

Novell, Inc.'s plans to introduce an SQL data base product this summer via its Softcraft, Inc. subsidiary will not necessarily deter users of its Netware network operating system from using competitive products.

Austin, Texas-based Softcraft is readying a new version of its Btrieve data base utility that is said to feature full ANSI-standard SQL. In addition, Novell is reportedly working on a multiple coprocessor high-performance

*Continued on page 73*

# Versatile Netmaster ousts IBM

BY PATRICIA KEEFE
CW STAFF

GREENVILLE, S.C. — A countywide medical network here was able to achieve significant savings and greater functionality by cutting out IBM's host-based Netview network management system and transplanting Netmaster, a competitive product from Cincom Systems, Inc.

"In three years, the money we'll have saved from Netview costs will have paid for Netmaster," said Jerry Madden, senior software analyst at the privately run countywide organization.

Admittedly "true Blue" when it comes to hardware and major medical applications, Greenville Hospital System (GHS) is a little more adventurous when it comes to systems software, Madden conceded.

For example, the computer center recently went through a data base evaluation process and chose the Ideal fourth-genera-

*Continued on page 72*

**Inside**


- Telebit, Hayes add modems. Page 72.
- Banyan users rally for DEC support. Page 73.
- Dataspace hardware device allows remote access to Appletalk network via phone lines. Page 74.



# Can Your Unix DBMS Guarantee Data Integrity?

Data integrity is essential for any commercial application. Unfortunately, no Unix-based DBMS product is able to provide absolute data integrity without sacrificing performance or forcing the use of complicated raw devices. Except the ORACLE® RDBMS.

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Unix has a special option called "write-through cache" which allows blocks of data associated with a particular file to be marked for an immediate write to disk; your application cannot continue until the write has been completed. ORACLE uses this feature to guarantee that those blocks of data associated with your database are on disk before the words "transaction completed" ever appear on your terminal's screen. Other Unix database vendors — 1) Don't address the problem at all, 2) Force a complete flush of all data in the buffer cache causing tremendous performance degradation or 3) Require the use of complex raw devices.

### Other Unix database vendors

1) Don't address the problem
2) Sacrifice performance
3) Use complex raw devices

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# DCA

CONTINUED FROM PAGE 65

area networks. Now we have a very tangible answer.

**10Net has traditionally received 70% of its revenue from overseas; the reverse is now true. How did you do it?**

*Goodall:* We've branched out into the government sector and small- and medium-size business markets. We've also leveraged the reseller and distribution base DCA already has in place to give us a great opportunity not only to crack new markets but deepen our penetration of markets we're already in.

**10Net's fiber sales have increased considerably because of your push into the government sector. Will this continue?**

*Goodall:* Definitely. We'll be introducing some add-on fiber products very shortly that will allow us to get involved with large-bid opportunities. Now that we've got our foot in the door, it's opening up additional governmental opportunities for our standard twisted-pair product.

"IN THE PAST, we've always had a lot of questions about what we are doing about local-area networks. Now we have a very tangible answer."

JIM OTTINGER
DIGITAL COMMUNICATIONS ASSOCIATES, INC.

**Can you map out 10Net's OS/2 strategy?**

*Goodall:* With the release of 10Net Plus, we have full [IBM] Netbios and full Server Message Block [SMB] protocol support. Part of Microsoft's LAN Manager was the support of the SMB protocols within the LAN Manager. So, we fit into that very nicely. We also have a 10Net Plus operational in the DOS environment, interoperating via a Sytek Netbios bridge to a LAN Manager OS/2 environment with full file and printer sharing. So, we're offering a migration path.

**Does DCA have the resources to pull off its Communications Manager alternative, or will it have to subcontract the work out?**

*Ottinger:* We're going to do that 100% in-house. We have 30 to 40 engineers working on it now, and we have up to 300 engineers if we need them. We are fully confident that we can complete the project with no problem.

**10Net's recent unbundling of its software puts it in direct competition with Novell, Inc.'s Netware. With Netware so entrenched, aren't you swimming against the tide?**

*Goodall:* It wasn't done to be directly competitive with Netware in an MIS department in a Fortune 100 company. It's really [targeted more at] an IBM Personal Computer LAN program environment. Users who have a token-ring hardware environment now have a couple different products to choose from, but not many.

Perhaps a medium-sized or small company wishes to implement token-ring hardware. Now, they can get the advantages of 10Net software, as opposed to a more complex and expensive offering, such as Netware.

**Can you give an update on a couple of projects announced after the merger? One was a bridge linking 10Net to IBM's Token-Ring network.**

*Goodall:* We'll shortly be releasing a Netbios bridge, which we have in beta test, and an [Apple Computer, Inc.] Macintosh-level bridge. The Netbios bridge will allow us to bridge from a 10Net Plus twisted-pair or fiber-optic LAN cluster installation into a token-ring or Ethernet cluster.

"WE'VE CREATED quite a bit of awareness and sales for 10Net products."

GREGG GOODALL
10NET COMMUNICATIONS

**What about an intelligent 10Net card with an on-board processor and random-access memory?**

*Goodall:* We have de-emphasized that product in lieu of some more advanced fiber-optic offerings. There's more opportunity there.

**What's ahead for your companies, both separately and together?**

*Ottinger:* We're going to use 10Net as our main technical vehicle for LAN products. They've got a very solid and well-rounded product line that's been very profitable, and their sales have increased threefold since the merger. We [may] help them with some direction, [but] essentially they've got free rein.

*Goodall:* Now, we must concentrate on leveraging the distribution strength DCA has to help pump as much of our products into the market as we can.


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# Fleig

FROM PAGE 65

selling everything from processors to software applications to network management programs to voice/data customer-premise equipment.

By using telecommunications for competitive leverage, IBM effectively ups the marketing ante, not only for traditional telecommunications suppliers, but also for data processing and data communications vendors and the minicomputer and personal computer suppliers that see communications offerings as a key part of their system sale.

IBM is raising the stakes with three primary tactics: acquisition, alliance and accommodation. So far, its most visible moves have been via acquisition: most notably, its cornerstone 1985 acquisition of Rolm.

Rolm, of course, gave IBM access to vital computerized branch exchange technology, as well as an established group of experienced telecommunication marketing representatives and system engineers to sell and service the equipment. IBM used a similar, albeit less drastic, tactic with Network Equipment Technologies (NET). Although IBM did not actually acquire NET, the joint-development agreement signed between the two vendors has essentially given IBM the right to acquire NET's T1 protocol technology.

The company's most recent acquisition is Pactel Spectrum Services, the ailing customer service and troubleshooting unit of Pacific Telesis Group. Left to its own devices, Spectrum Services is potentially as insignificant to IBM's bottom line — except in terms of losses — as it proved to be to Pactel's. But, rolled into the IBM National Services Division to support Netview and telecommunications-specific systems integration projects and to establish a niche service for facilities management programs, Spectrum Services should add a strong value-added offering to IBM's telecommunications arsenal.

### Phases 2 and 3

Alliances are the second key component to IBM's competitive telecommunications edge. IBM has formed joint-development and technology cross-licensing agreements with firms worldwide, including United Technology, Ericsson in Sweden, Siemens AG in West Germany and Nippon Telephone and Telegraph in Japan. In addition, IBM's concentrated efforts to solicit third-party product development under Netview have resulted in nearly 30 vendors' participation.

And, during the last 18 months, particularly since the introduction of Netview/PC and Open Communications Architecture, IBM has shown a strong tendency to accommodate its telecommunications offerings to the customer's installation. In IBM lexicon, accommodate means to provide an interface into or a method of managing non-IBM products, services and transmissions.

These types of interfaces currently include the following: Business Communication System, designed as the interface into IBM's Systems Network Architecture (SNA) for voice and non-IBM data traffic; and Netview/PC, designed to manage voice, IBM's Token-Ring network and non-SNA data traffic within the SNA environment. The Netview/PC-based Rolm Alert Manager, for example, currently accepts alerts from Northern Telecom and AT&T PBXs. That same kind of accommodation is also likely to occur for European PBX makers.

Given the growth potential of telecommunications projects in the government, commercial and system integration market segments, as well as the increasing importance of communications integration at all levels of the business market, it is a virtual certainty that IBM will acquire, align, accommodate and leverage its way into a leadership role as a telecommunications provider.

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Fleig is director of systems research specializing in local-area networking and IBM communications for International Technology Group in Los Altos, Calif.



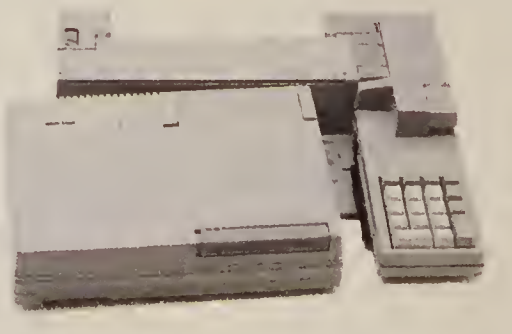
# TI's new TravelMate™ LT220. It's the closest thing to carrying a VAX™ in your briefcase.

Texas Instruments introduces the LT220 lap-top terminal — the next best thing to being there when you need remote access to your company's VAX.

The LT220 provides full VT220 emulation in a 4.8-lb. package, without sacrificing functionality. It features a 25-line screen that's easy to read. It even has a full-function keyboard like the one on a VT220.

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let you create, update and store files. They're also handy for programming the LT220 to your specific application.

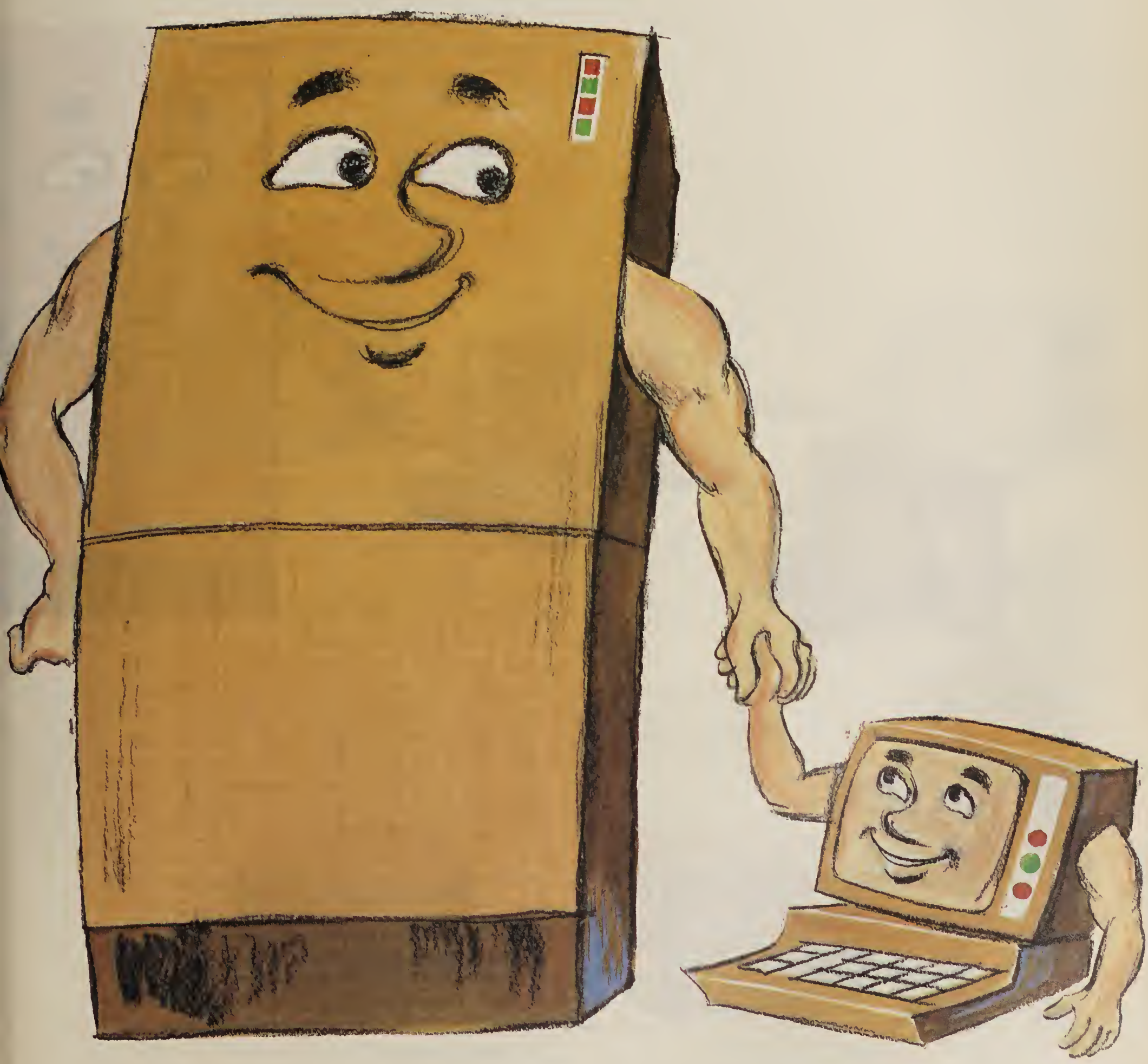
Like its Silent 700™ predecessors, the LT220 sets new standards for portability, durability and reliability. All of which makes it the perfect tool for anyone who's ever wished for a VAX in their briefcase. In short, this may be the best little terminal in the world.

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# The PC war is over.

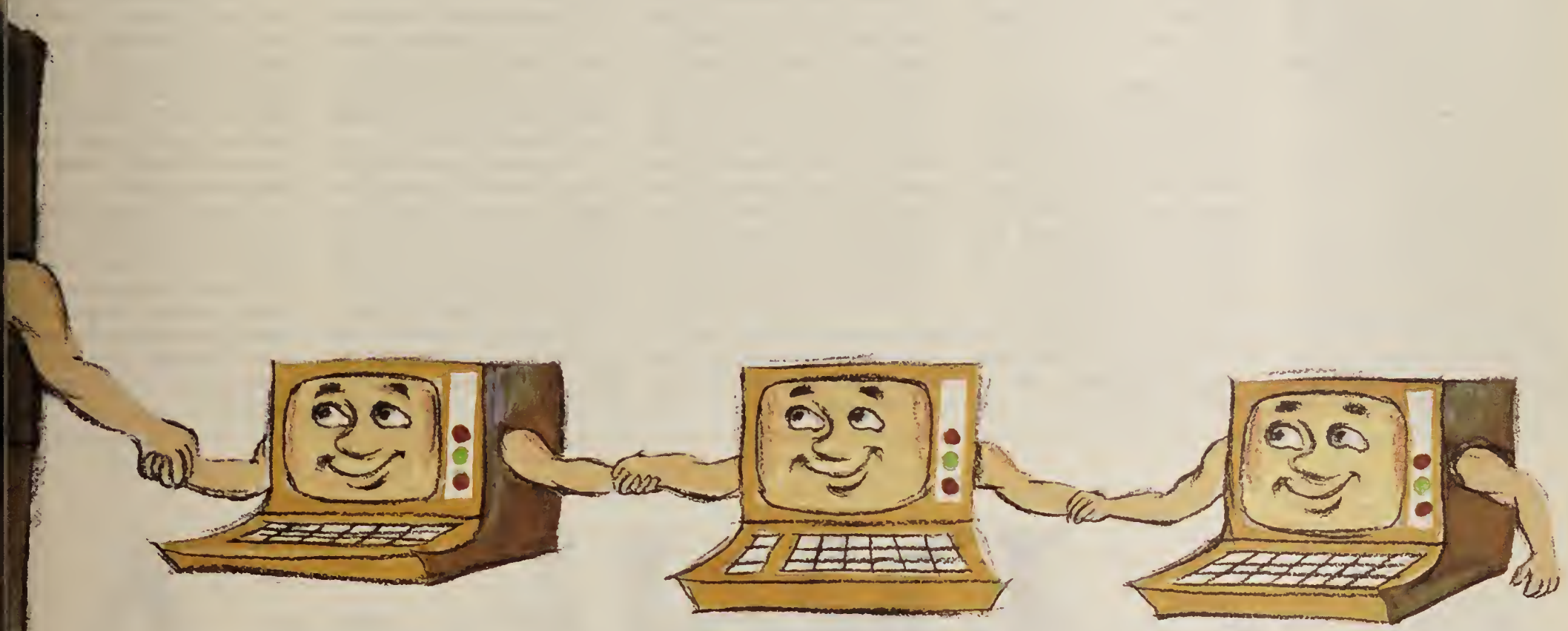


**The mainframe.**

**The PC.**

# PC Integration: the world of

# Hottest topic in computers.



The PC war is over, and the computer professionals have won.

Almost overnight, the market for personal computers has changed. The individual user no longer runs out and buys whatever strikes his or her fancy.

PC's have grown up, and MIS has taken over responsibility for their role in the corporate information system. "During the past three years, everything has become integration," says Leon Jackson, senior research analyst at Arthur D. Little. "The only computer force that can provide integration is MIS."

The standalone personal computer has become part of a network. And MIS departments are working to set PC standards so that their organizations can benefit from sharing of information, including databases and software.

The stakes are huge. This year, companies will spend more dollars buying PC's than they will spend on mainframes.

And who will control this spending? The readers of Computerworld, of course. It's the newspaper of record for information systems management. Put your money where your market is. In Computerworld.



THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
January 11, 1988 Vol. XXII No. 2 128 Pages $2/Copy $44/Year

COMPUTERWORLD

INSIDE

Spotlight — Terminals acquire processing power. Pullout section on terminals and terminal emulation follows page 64.

In Depth — PC support dollars dry up. Page 61.

Lining up as the principal partner of fast-changing Sun Microsystems, AT&T inks deal to acquire up to 20% of the workstation vendor. Page 73.

End users with few programming skills are target of two Easytrieve versions being announced by Pansophic Systems this week. Page 12

Unisys delivers cartridge tape subsystem designed to work with both of its mainframe lines. Page 14.

Prime's buy-out offer rejected by Computervision, but CAD/CAM shakeout seen inevitable. Page 96.

Management focus: Career paths for MIS professionals not inclined toward the executive track. Page 65.

Excel or 1-2-3? Deciding which best suits user needs. Page 29.

NSA to lose control of civilian security measures in legislation awaiting President Reagan's signature. Page 13.

Timeplex to offer modular packet-switched processor in family of products being announced this week. Page 6.

Desktop MIPS war

Coastal rivals ready single-user supercomputers

BY STANLEY GIBSON and JULIE PITTA

It's happening again.

In the grand tradition of the computer industry's East Coast/West Coast rivalries, two young companies are set to go head-to-head, pitting new but contrasting technologies and distinct corporate cultures against one another in a race to put new supercomputer power on a desktop.

Ardent Computer Corp. in Sunnyvale, Calif., and Stellar Computer, Inc. in Newton, Mass., are planning March rollouts for "desktop supercomputers." The machines will reportedly bring 20 million to 60 million instructions per second, 40 million to 80 million floating-point operations per second and elaborate graphics to a single user for less than $100,000.

Art to engineers

The machines fill a gap between current high-end workstations and minisupercomputers, combining features of both. Key applications are expected to be circuit modeling, computational fluid dynamics and computer animation. One goal, the firms said, is to get scientists and engineers to start thinking of their applications in terms of pictures.

Neither product has been formally announced, but the companies have already begun competitively bidding their machines.

Continued on page 8

OS/2 team heads off code fears

BY ALAN ALPER

NEW YORK — Looking to head off a controversy over minor differences between their versions of the OS/2 operating system, Microsoft Corp. and IBM last week went to great lengths to proclaim that the packages are functionally identical.

The differences between Microsoft's MS OS/2 and IBM's OS/2 relate primarily to hardware configuration support, installation and documentation, company officials said. Those variances are transparent to the average end user, since the application program interface, user interface and command sets of each are exactly the same, the officials added.

Because Microsoft is offering OS/2 to personal computer makers other than IBM, its version supports a broader array of third-party hardware configurations, including support for systems using the IBM Personal Computer AT bus in conjunction

Continued on page 15

Computer firms braced against takeover winds

BY CLINTON WILDER

ANALYSIS

Prime Computer, Inc.'s use of hostile takeover techniques to acquire Computervision Corp. is a rare strategy among computer vendors — and is likely to remain so.

Even if Prime's $391.5 million buy-out offer is successful, the battle hasting up along Massachusetts' Route 128 does not portend a wave of unwanted suit-

ors seeking takeover targets.

In the uncertain financial times following the "Crash of '87," the computer industry should remain relatively unscathed from the activities of corporate raiders and conglomerate builders.

Prime's attempted takeover stems not from the financial motivation to take advantage of a depressed stock price but from the strategic desire to dramatically expand its presence in the computer-aided design and man-

Continued on page 36

Mechanically inclined

*If Prime's hostile takeover bid to acquire Computervision succeeds, it would vault Prime to the CAD/CAM market wall among*

| | Revenue[1] | Profits[1] | Employees | CAD/CAM revenue[2] |
|---|---|---|---|---|
| Prime | $890.2M | $46.9M | 6,400 | 18% |
| Computervision | $496.7M | -$5.7M | 4,700 | 100% |

[1] Last full fiscal year [2] Percent of company's total revenue

CW CHART

Because *anyone* can get a 3090

BY KATHY CHIN LEONG

What the IBM is to a yuppie, the Cray supercomputer is to a scientist — a symbol of prestige. It's fast, it's powerful, and it's expensive.

Since Seymour Cray began product development at his Chippewa Falls, Wis., lab in 1972, Cray Research, Inc. has delivered more than 130 of the supercomputer behemoths to 113 customers. Users range from Ford Motor Co. in Detroit to Abu Dhabi National Oil Co. in the Middle East.

While large MIS shops can easily order 100 personal computers, when it comes to multimillion-dollar Crays, customers can be very hard to justify one. Whereas an IBM Personal Computer AT can be perched atop a desk, an 11,000-pound Cray X-MP/4 seems is often housed in its own chambers with extra supports so that the machine will not penetrate, let alone scratch, the flooring.

Cray customers have unusual computing needs that cannot be met by commercial mainframes. Some zealous Cray users say Crays are needed to ensure that the U.S. remains a leader in aerospace weaponry. Others are convinced that the use of a Cray will enable them to prolong human life through better drug development.

Certainly, Cray isn't the only game in town when it

Continued on page 37

Supercharged

*Independent economic forecasters see Cray as the clear leader in the relatively small but lucrative market for supercomputers*

WORLDWIDE INSTALLATIONS*




* Excludes internal systems

INFORMATION PROVIDED BY A VAN PETER, HAFFNER & HOPEWOOD PORTFOLIO MANAGER; PEARL C. GUTOWSKI

NEWSPAPER

## Computerworld: The newspaper of record.

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# Telebit, Hayes fill modem gap

BY PATRICIA KEEFE
CW STAFF

Introductions last week from two major players in the modem market put yet another notch on their standards belts.

Telebit Corp. in Mountain View, Calif., entered the synchronous market with what it claimed is the industry's fastest dial-up modem. The Telebit T2000, which operates at 19.2K bit/sec., supports IBM's Systems Network Architecture and Synchronous Data Link Control (SDLC) communications.

Telebit claimed it provides the cost efficiencies of a dial-up modem network without sacrificing performance.

Telebit's Packetized Ensemble Protocol reportedly enables the Telebit T2000 to intelligently divide telephone bandwidth into hundreds of independent data channels and transmit data across the entire bandwidth. When faced with deteriorating line conditions, T2000 modems adjust their data transmission rates in small increments, maintaining high speeds while ensuring data integrity vs. dropping data transmission by up to one-half, Telebit said.

T2000 modems also provide built-in processing power, asynchronous communications, guaranteed error-free data delivery and local acknowledgment of host-generated SDLC Supervisory Frames and Information Frames.

### Hayes throws in support

Continuing its support for international standards, Hayes Microcomputer Products, Inc. said it will provide products implementing the new CCITT Recommendation V.42, which ensures point-to-point modem error control.

Establishment of this standard enables the communications industry to shift its focus to the future of point-to-multipoint communications through public data networks, the CCITT X.25 standard and Integrated Services Digital Network, the Atlanta-based firm said.

Hayes said it will offer a firmware upgrade for current and past V series system products to ensure compatibility with the new V.42 standard.

# Netmaster

FROM PAGE 65

tion language and Datacom data base from Princeton, N.J.-based Applied Data Research, Inc., bypassing IBM's DB2.

Similarly, when searching for a network management package that could meet several objectives outlined by a GHS vice-president, Madden said his department chose Netmaster. "We went through a 30-day trial in January and never took the product [off-line]."

Cincom claimed Netmaster could do everything IBM's Netview could do and more, Madden said. This is important because Netmaster has to support a vast and mountainous array of IBM equipment at GHS, which has "just about one of everything IBM makes," Madden noted.

That translates into 600 terminals, including 150 to 200 IBM Personal Computers and some Personal System/2s; one System/38; four or five System/36s; two 5520s; and two mainframes — a 3081 and a 4381 that run MVS/XA and VM, spread out across a 2½-mile campus and beyond, into nine hospitals and several clinics and mental health centers throughout the county.

In addition, the GHS is in the process of implementing an IBM Token-Ring network. The largest on-campus facility is Memorial Hospital, which uses coaxial cable-based direct attach for connectivity. Other on-campus buildings are attached remotely through either telephone lines or a Rolm Corp. switch.

### Looking out for users

Beyond supporting this IBM environment, GHS had other network management requirements: provide one front-end user sign-on screen, avoid forcing users to sign on twice under a new security package and provide support for multiple sessions for users via software vs. hardware.

Madden said when he went to his IBM representative, he was told Netview could not meet those demands — a statement later refuted by an IBM Netview specialist, but too late.

So Madden and his manager did not look at Netview. They looked instead at Netmaster, V Man from Computer Associates International, Inc., Super Session from Candle Corp. and TPX from Duquesne Systems, Inc.

"Netmaster could meet our requirements immediately, and it was also the full equivalent of Netview plus [more]," according to Madden.

Several key Netmaster enhancements included a session capture facility, which allows the help desk attendant to view a user's screen, and the ability to record problems in an application in order to view them later.

Netmaster is up and running everywhere but is not yet fully implemented. The single-user interface should be on-line by the end of this month.

Madden pressed Cincom on future directions. One area of concern was IBM's central site customization feature, which allows MIS to customize at one site and transmit to a remote site via Netview. Cincom promised similar support.

"In all fairness to IBM, we were using Netview Version 1, which, as I remember, is packaged differently than a later, improved version of Netview," Madden said. When GHS bought Netview, back in the fourth quarter of 1986, "there was really nothing else."

Even so, comparing Netmaster with Netview today, Madden questions how anyone could be willing to pay for the latter after seeing the former. Even the IBM Netview specialist, who flew in to see Netmaster, admitted the product was "slick," Madden concluded.


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# Users rally Banyan for DEC support

BY JAMES DALY
CW STAFF

At a recent meeting of the Association of Banyan Users International (ABUI), a Banyan Systems, Inc. representative asked how many would be interested in a version of Banyan's Virtual Networking Software, or Vines, operating system for the Digital Equipment Corp. environment. Dozens of hands went up.

"Then I'm afraid the news I have to report won't be encouraging," confessed David Williams, Banyan's director of product planning, "as our DEC compatibility plans have been pushed down the pike a little."

The resultant audience grumble as Williams explained that Apple Computer, Inc. Macintosh and IBM and Microsoft Corp. OS/2 compatibility had "been pushed higher into the queue," spoke volumes about how important DEC connectivity is to many Banyan users. According to analysts, many Banyan users employ DEC VAXs for number-crunching duties.

"The delay was expected because they had gotten so wrapped up in finishing up Vines Version 3.0, but we still wanted specifics," ABUI Vice-President Derek Flickinger said. Within a few hours of Williams' unsettling news, ABUI members launched a DEC special interest group.

Nearly 50 companies responded to a hastily arranged meeting between Banyan and the fledgling group during the waning hours of the conference. Some participants rearranged or canceled flights to attend.

The group asked for better integration of terminal emulation, servers running on DEC's VMS and for Banyan's response to Novell, Inc.'s Netware on VMS, a spokesman said.

The group is confident that Banyan will give them more than lip service. Banyan management recently stated that the firm gets 80% of its ideas from users.

Although Williams assured users that their plans for a higher level of DEC connectivity will certainly not be abandoned, "we also have to stress our longer range strategic objectives," he said. "While it's clear our users are very serious about DEC, we have to look at both ends of the market."

# Btrieve

FROM PAGE 65

server [CW, May 2].

The SQL Btrieve was to be unveiled at the June PC Expo in New York.

Softcraft has referred all questions to Novell, which declined to comment beyond saying it was not announcing a product at this time.

Where Softcraft reportedly is taking a back-end approach, other SQL products will include a front end. Needs and expertise will determine which way Novell users go, according to Lloyd Caldwell, a data base administrator at the Utah College of Business Computer Center in Salt Lake City.

A back-end engine only holds the data, responds to queries and sends off data. Users seeking speed, fault tolerance and transaction processing capabilities might stick with SQL Btrieve under Netware, as might users willing to write applications that enable them to manipulate the data they have accessed, Caldwell said.

"The Btrieve stuff really screams — it's a lot faster than anything else I've seen," Caldwell added. Conversely, other users may prefer a full-blown SQL data base, or one that includes a front end — specifically, report generation, input generation and other applications.

SQL Btrieve is expected to counter SQL server capabilities offered by Microsoft Corp. and Sybase, Inc., IBM, Ashton-Tate Corp. and Lotus Development Corp. It also helps Novell to round out its suite of OS/2 connectivity offerings.

### Sock it to 'em

"Once again, part of Novell's strategy is centered on counterpunching both the strategy and tactics of Microsoft, while also providing a performance edge over the [Microsoft and Sybase] data base," commented David Terrie, president of Newport Consulting, Inc. in Scituate, Mass.

Part of Novell's challenge will be to get third parties to write front ends to its back end, Terrie added. "IBM and Microsoft have a whole lineup of third parties that will introduce important applications for their end users," said Richard Finkelstein, a senior consultant with Codd & Date Consulting Group.

The potential buyers of Novell's SQL offering include its very large installed base, estimated by Dataquest, Inc. to be 50% of the personal computer local-area network market. Btrieve, too, has a huge installed base, Finkelstein said.

"My customers are very interested," said Tyrone Pike, president of LAN Systems, Inc., a Novell reseller and Btrieve developer in New York and Los Angeles. Many of his accounts use Digital Equipment Corp. VAXs, IBM MVS, TSO and DB2 and Oracle Corp.'s Oracle data base.

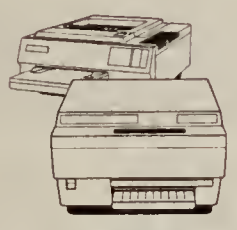
The SQL engine would provide Netware users with access to DB2 or Oracle Corp. servers off the network environment, Finkelstein said.

The current SQL-based Btrieve can run as a back-end data base process on the server and lacks ad hoc programmatic interfaces to let users make quick tabular reports, for example, Pike said. "To make SQL a full ANSI-standard SQL is not a radical departure from what they have today."

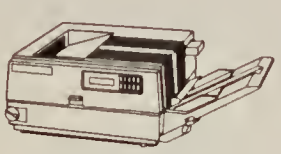
To effectively compete with these products, the updated Btrieve will have to offer an open application programming interface that is third-generation oriented for procedural languages; object-oriented tools; complete data integrity; commit and rollback; recovery and security facilities; a cooperative mode operation with other SQL servers; and remote access, Finkelstein said.

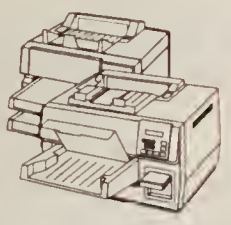

# And choose.

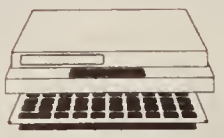

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Model 908

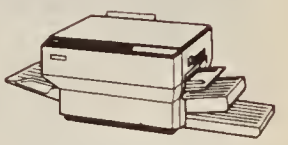

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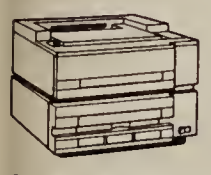

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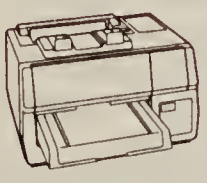

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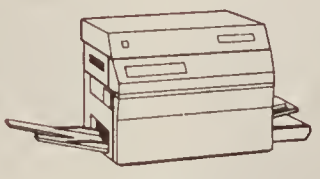

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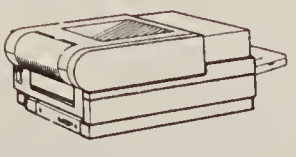

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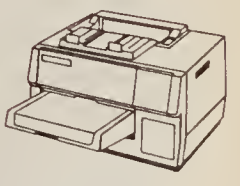

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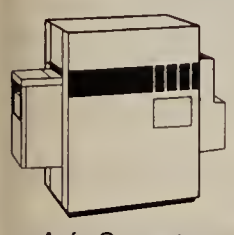

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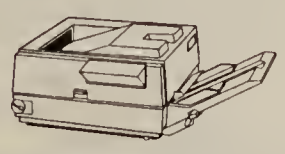

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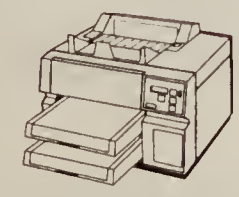

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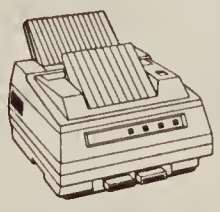

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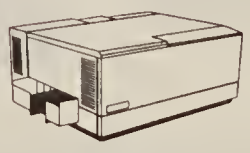

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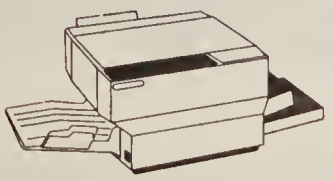

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## NEW PRODUCTS

### Local-area network hardware

A hardware device that allows remote access to an Apple Computer, Inc. Appletalk network via telephone lines is available from **Dataspace Corp.**

The **Telenode** is a node on an Appletalk network connected to any intelligent modem, which is then attached to an external telephone line. Hardware configuration may take two forms: asynchronous connection via modems and asynchronous connection via a public branch exchange.

The Telenode is compatible with modem speeds between 1,200 and 19.2K bit/sec. on the asynchronous side and standard 230.4K bit/sec. Appletalk on the other side.

The Telenode costs $595.

Dataspace, Unit 9, 185 Riviera Drive, Markham, Ont., Canada L3R 5J6. 416-474-0113.

### Local-area network software

**Meridian Technology Corp.** has announced **Outlat/DOS**, a software implementation of Digital Equipment Corp.'s Local Area Transport protocols for Microsoft Corp. MS-DOS. The product permits IBM Personal Computers and compatibles to connect as Local Area Transport terminals to DEC VAX/VMS systems.

Included is a device driver for 3Com Corp.'s 3C501 and Micom-Interlan, Inc.'s N15010 Ethernet interfaces. The product does not require Decnet.

Outlat/DOS is priced at $150.

Meridian Technology, P.O. Box 2006, St. Louis, Mo. 63011. 314-394-1600.

### Links

**Data Design Associates** has announced a new version of **DD-Link**, its micro-to-mainframe link that supports the IBM Personal System/2 series. DD-Link allows users to store mainframe data on the microcomputer without programmer assistance, enabling the user to manipulate data at any time without the delays associated with mainframe batch processing.

The product is available for the IBM 3270 Emulation board and supports IBM's High Level Language/Application Program Interface.

Pricing starts at $10,000 for the initial machine and $2,500 for each additional PC. Site licensing is available.

Data Design, 1279 Oakmead Pkwy., Sunnyvale, Calif. 94086. 408-730-0100.

### Modems/Multiplexers

A speech data multiplexer that allows one voice channel and one data channel to be combined over the same tie line or analog leased line has been announced by **Advanced Compression Technology, Inc.**

The **SDM-1** uses a proprietary voice-compression algorithm to provide communications-grade voice quality at 9.6K bit/sec.

Other features include built-in adaptive echo cancellation and suppression for use with two- or four-wire circuits.

An integral off-premise exchange option permits use with key telephone systems.

Dynamic bandwidth allocation automatically shifts unused voice bandwidth to the data channel or vice versa.

The SDM-1 carries a price tag of $1,990.

Advanced Compression, Suite 104, 31368 Via Colinas, Westlake Village, Calif. 91362. 818-889-3618.

### Diagnostic equipment

A personal computer-based protocol analyzer said to provide decode analysis for IBM's Systems Network Architecture, CCITT X.25, V.35 and Integrated Services Digital Network protocols has been introduced by **Atronix, Inc.**

The **Atronix LM1 Protocol Analyzer with Version 4.0 Software** features Level 3 decode protocol analysis as well as autoconfiguration, time stamping, a soft breakout box, a built-in asynchronous terminal and interactive Basic simulation. Character, hex and mnemonic data is displayed in real time, with IBM Synchronous Data Link Control frame data available during buffer display.

The analyzer fits in a half-card slot in an IBM Personal Computer or compatible. It is priced from $1,595.

Atronix, 780 Boston Road, Billerica, Mass. 01821. 617-663-5100.

### Cabling

The **Plexit** twisted-pair Ethernet driver designed to replace Ethernet transceiver cables has been unveiled by **Plexcom, Inc.**

The Plexit driver can be used in pairs or with a concentrator, the vendor said, and it permits data transmission over existing telephone wire to a remote peripheral. It is available with an optional external power supply. Up to 250 ft of horizontal unshielded twisted-pair cable between the wiring closet and the work area is supported.

The Plexit costs $95 or $135 with the power supply.

Plexcom, 65 Moreland Road, Simi Valley, Calif. 93065. 805-522-3333.


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# SYSTEMS & PERIPHERALS

HARD TALK

*Stanley Gibson*

## Silverlake advent nigh?



What began as heresy only one year ago is now orthodoxy: Silverlake is the real VAX killer.

This is the new consensus of industry analysts and observers, many of whom took as dogma in 1987 that the IBM 9370 was to be IBM's mid-range messiah.

But the 9370's disappointing first year and the willingness of consultants to believe in the ill-defined and mysterious — despite their rational instincts — has led to a coalescing of belief around Silverlake.

Thus it has come to pass that a product that is still technically a rumor now carries the ball for IBM in its most contested market. The world's largest computer company is fighting off DEC's dreaded VAX with an unannounced product.

Many users, petitioning universal powers for guidance, have had revealed to them out of the Blue that there will indeed be a Wonderful Processor, and should they believe in It, they will be saved. Indeed, angels from Armonk have been visiting many doubting souls and revealing all to them. The humble users must not, however, dis-

*Continued on page 78*

# WORMs to enjoy storage reign

BY J. A. SAVAGE
and STANLEY GIBSON
CW STAFF

There are as many recording standards for 12-in. write-once read-many (WORM) optical disk drives as there are earthworms in a spring garden, and the number is not likely to decrease. However, for the 3½- and 5¼-in. WORM varieties, the laws of natural selection will settle disk writing standards, probably by the next harvest moon.

The standards will make it possible for one manufacturer's disks to be read by another maker's drives. The result will likely be an increasing number of optical storage devices creeping into data centers nationwide.

The American National Standards Institute (ANSI) technical committee, X3B11, voted Continuous Servo the standard for 5¼-in. media in late March. A final vote is expected in July.

Continuous Servo was approved over Sampled Servo and Sampled Servo with a variable track pitch, which allows for track compression and, therefore, room for technological growth, supporters said. However, these standards may yet gain separate approval, according to Ken Hallam, president of ENDL Associates in San Juan Capistrano, Calif., a consulting firm specializing in standards. Hallam sits on the ANSI technical committee.

The Continuous Servo standard continually looks at a track, such as a Winchester drive, whereas Sampled Servo samples a track at timed intervals. Continuous Servo is claimed to be faster, and Sampled Servo is supposedly cheaper. The committee is currently deciding whether or not the advantages of both are distinct enough to warrant establishing two separate standards, according to Hallam.

*Continued on page 77*

# Minisuper unveiled

*Floating Point adds low-cost low-end unit*

BY J. A. SAVAGE
CW STAFF

BEAVERTON, Ore. — Taking little time for breath between product announcements, Floating Point Systems, Inc. recently unveiled a low-end minisupercomputer for technical applications that runs 30% faster and costs 30% less than its predecessor.

The company is trying to reestablish itself after more than a year of enormous losses — $35 million since January 1987.

The M64/35 MCAE Superserver, which is said to process as many as 40 simultaneous compute-intensive jobs off-loaded from engineering workstations, was unveiled less than a month after the company introduced the M64/145, a high-end addition to the same M64 series.

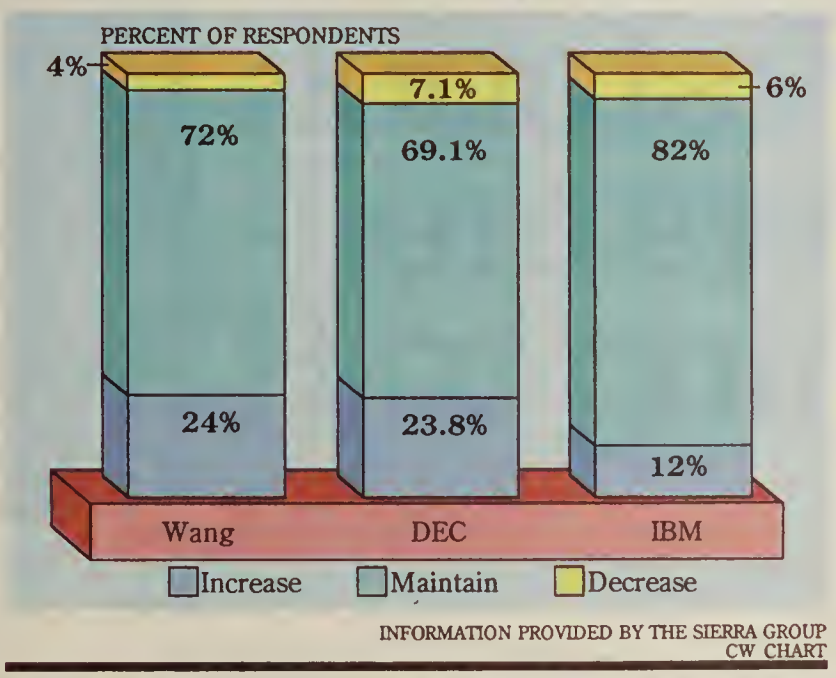
Applications such as fluid dynamics analysis using FIDAP software from Fluid Dynamics International run up to 12 times faster on the Floating Point system than on a Digital Equipment

*Continued on page 76*

# Can PC LANs succeed where 9370 failed?

**Cutting deeper inroads**

*Compared with IBM users, larger percentages of Wang and DEC customers plan to increase mid-range expenditures this year*




INFORMATION PROVIDED BY THE SIERRA GROUP
CW CHART

BY STANLEY GIBSON
CW STAFF

TEMPE, Ariz. — Digital Equipment Corp. will continue to make inroads into the mid-range computing heartland of American financial and banking institutions, according to a recent study by The Sierra Group. And IBM's best hope in curtailing further loss of mid-range turf to DEC lies not in its own minicomputers but in personal computer-based local-area networks, the study found.

"IBM has been unable to leverage its presence as the mainframe vendor of choice to the minicomputer arena and, in fact, has seen its account control erode as respondents reported DEC departmental systems in-

*Continued on page 78*

**Inside**


- HP tape subsystem compresses data. Page 76.
- Emulex reins in disk controller. Page 79.
- Megatape adds backup drives, subsystems. Page 79.



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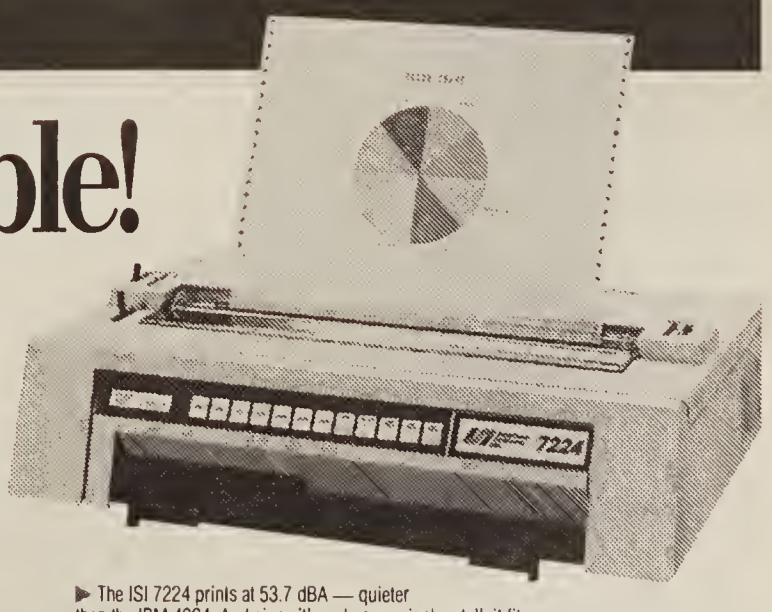
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# HP drive offers data compression

BY JAMES A. MARTIN
CW STAFF

GREELEY, Colo. — Hewlett-Packard Co. announced last week what it claimed is an industry first: A ½-in. reel-to-reel streaming tape drive featuring data compression built in to the drive.

The HP 7980XC tape drive is said to use a data compression algorithm that was designed in to the electronics of the tape drive, producing compression ratios of up to 5-to-1. Those ratios are reportedly higher than what is possible with software compression, allowing more information to be stored on a tape.

The benefit of hardware data compression is that it enables the compression to be accomplished independently of the host system, according to Robert C. Abraham, vice-president of Freeman Associates, a Santa Barbara, Calif.-based storage consulting firm.

Currently, only one IBM-compatible tape drive on the market — Hitachi Ltd.'s MT300X — offers data compression, according to Abraham. The HP 7980XC reads and writes data in industry-standard 1,600 and 6,250 character/in. densities. Both formats are IBM and ANSI compatible.

The 7980XC is available now for $32,200. An upgrade kit that converts an existing 7980A autoload tape drive to a 7980XC is available for $11,000.

# Minisuper

FROM PAGE 75

Corp. Microvax II and up to seven times quicker than on a Sun Microsystems, Inc. Sun-3/160, a Floating Point spokesman said. The M64/35 replaces the M64/30, which is not upgradeable.

The M64/35 has a base price of $79,900, which includes 8M bytes of memory and a 300M-byte internal disk drive. Also included is software to connect to a host computer, which can be either a DEC VAX or Sun workstation. Software to connect the M64/35 to Ethernet networks with Decnet, Transmission Control Protocol/Internet Protocol or Sun's Network File System protocol is extra.

The system is slated to be available in 90 days.

The M64/35 has a 64-bit word length and 64,000 vector registers. It is expandable to 128M bytes of memory and up to 7.8G bytes of disk storage.

# Massively parallel system unveiled

BY STANLEY GIBSON
CW STAFF

IRVINE, Calif. — Active Memory Technology, Inc. (AMT) announced a low-price massively parallel computer system for number crunching applications last week.

The DAP — for distributed array of processors — 510 is intended to operate with a Digital Equipment Corp. VAX or Sun Microsystems, Inc. workstation as a front-end processor. The DAP 510 was designed to handle numerically intensive applications for the host system.

Typical applications are signal processing, medical diagnostic imaging and genetic modeling in biotechnology, according to the vendor.

The DAP 510, which is priced starting at $120,000, can perform from 6 million floating-point operations per second (MFLOPS) to 60 MFLOPS.

The base model includes 1,024 one-bit processors with 5M bytes of memory and interfaces to VAX and Sun systems.

AMT provides software for application development that runs on Sun Microsystems workstations and DEC VAX minicomputers.

The DAP 510 is available 30 days after receipt of order.


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# WORMs

FROM PAGE 75

"You'll see the Continuous Servo standard be the one to emerge," predicted Jay Bretzmann, an optical storage analyst at International Data Corp. (IDC) in Framingham, Mass. Vendors supporting Continuous Servo outnumber the others four to one, he added.

The optical storage industry is expected to grow tenfold in the next five years, according to analysts at San Jose, Calif.-based Dataquest, Inc. Optical storage technology is cheaper per megabyte than other storage methods and allows for generally faster access than tape storage. The ability to store large amounts of data in a small space is also a great benefit of optical storage. Analysts said optical storage will catch on fastest in systems geared toward storing images.

Approval of the Continuous Servo standard paves the way for erasable disk standards, which are identical to WORM standards, according to ENDL's Hallam.

He said he expects the prices of erasable disk media to decline tremendously in the near future. Currently, there are engineering samples of erasable media available at about $1,000 per 400M bytes. Hallam also said he anticipates that price to plummet to $80 once the media is in mass production.

The next standard expected to be set is for 3½-in. media. In late March, a Japanese standards committee offered ANSI a standard for 3½-in. media that incorporates both Continuous and Sampled Servo. That proposal is being studied by the X3B11 committee.

However, the 12-in. market is likely to remain heterogeneous during the foreseeable future. "In the 12-in. arena, there is no hope for standards," IDC's Bretzmann said.

The use of 12-in. optical devices grew out of the effort to make videodisks. When the rise of videocassette recorders superseded that of videodisks, people looked for ways to make use of videodisk technology, Bretzmann recounted. A number of firms developed and marketed distinct technologies at about the same time. All gained some installed base, which made the vendors hesitant to change their systems for the sake of standards, according to Bretzmann.

> "IN THE 12-in. arena, there is no hope for standards."
>
> JAY BRETZMANN
> INTERNATIONAL
> DATA CORP.

Beyond recording standards for the physical disks, there is talk of establishing standards for the logic used in formatting the data so that optical drives can be plugged interchangeably into any host. But the chances for such standards appear slim.

Indeed, no manufacturers will interchange logic with each other, according to Hallam. "No one is terribly unhappy about it except for a few of their customers, but most are special systems where users don't care about interchange," he said.

As a nonvendor, Hallam said he hopes logic standards will be set so that optical devices will be truly interchangeable.

### Standards schmandards

Ricoh Corp., which manufactures 5¼-in. WORM disks, is not really interested in interchangeability standards, however. "All the manufacturers have committed money to developing their own standards," said Chet Mackentire, Ricoh's optical disk business manager in San Jose. "Tell me, who's going to throw that away and support a standard?"

Bretzmann said, however, that such standards could benefit vendors. "It's in all their interest in that it would jump start the industry more."

But with standards for 3½- and 5¼-in. media solidifying, Hallam said he does not think users will have to wait much longer for optical storage products to blossom. "Now, people who don't have real specialty needs can start thinking about optical."

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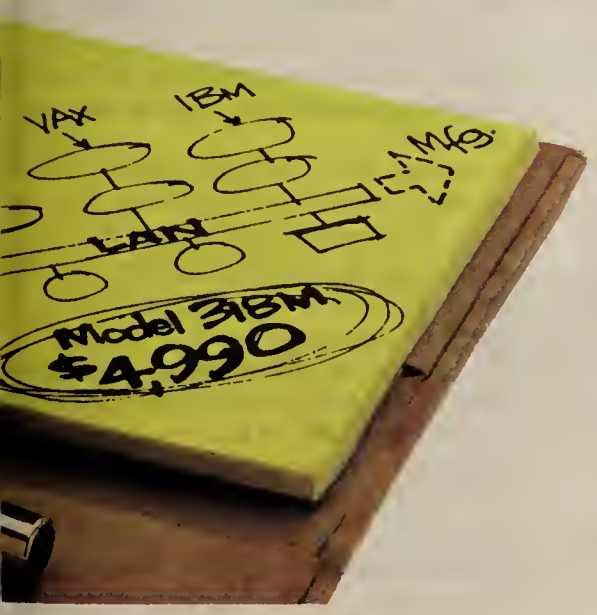
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# PC LANs

CONTINUED FROM PAGE 75

stalled in 24% of IBM's mainframe accounts," the report said. A typical subject of the survey was a large financial institution in the northeast with more than 5,000 employees.

Meanwhile, Wang Laboratories, Inc. is positioned firmly in third place with little prospect of changing its standing. And though many DEC sales were penetrating IBM mainframe accounts, Wang sales were less prevalent among those users. Nonetheless, the study found that Wang users are planning to increase Wang equipment purchases, even though overall Wang customer satisfaction trailed that of IBM and DEC. Wang's installed base in banking and financial accounts is considerably smaller than that of either DEC or IBM.

According to Nancy Kirk, the Sierra Group analyst who compiled the report, a logical conclusion of the study is that DEC's VAX has weathered the IBM 9370 challenge. Many mid-range customers looked at the 9370 while considering the purchase of IBM or DEC equipment, but a small percentage passed up the VAX for what was once called the VAX killer.

And a gloomier note for IBM is that the recently announced VAX 6200 series, code-named "Calypso," could spur an even greater defection of IBM users to DEC, according to Kirk. She said financial and banking users have expressed strong interest in the machines because of their symmetrical multiprocessing feature, which is geared toward improving performance in transaction processing, an important application for those customers.

### PS/2 to the rescue

The silver lining in IBM's cloud seems to be the Personal System/2's healthy acceptance among financial and banking customers despite some user frustration with the computer's operating system, OS/2. The PS/2's use as a departmental system in a LAN appears to be an antidote to unlimited VAX growth in IBM shops, Kirk said.

The Sierra Group study reported what has previously been noted by other observers: Spending on departmental minicomputers is beginning to slow down, while spending on PCs is increasing. Along with the sales of PCs, sales of LANs and servers are on the rise as well.

Banking and financial users said their No. 1 connectivity requirement is PC-to-PC communications; the No. 2 requirement was PC-to-mainframe links. PC-to-minicomputer networking ranked third. Kirk cautioned, however, that this result may indicate that PCs are already connected to minicomputers and the requirement is no longer outstanding.

Despite the threat on the PC front, the report concluded: "Based on the planned number of installations, [DEC] could exceed IBM as the preferred supplier within the financial markets in the coming years."


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# Gibson

CONTINUED FROM PAGE 75

close these things but must ponder them in their hearts until the proper time. Surely the willingness of many to believe in a miracle is a greater force than any machine that merely exists.

By and large, the worldly consultant community was slow to awaken. Early on, when most consultants were lost in idolatry for the 9370, a lone voice could be heard crying in the wilderness. David Andrews, president of ADM in Cheshire, Conn., was playing the part of John the Baptist, preparing the way for Silverlake and making straight the path for the true mid-range savior.

Alone and scorned by many, Andrews boldly asserted more than one year before Silverlake's announcement that it would outsell the 9370 by a wide margin. Truly, it would be the machine that would deliver the wandering, often feuding, tribes of IBM minicomputer users from bondage under a "VAX Romana."

But the consultant community would not be lost forever in darkness. Having believed wholeheartedly in the 9370 at first, they abandoned it in droves soon after it began to ship. By then, it was clear that there would be a follow-on for the IBM System/36 and 38. Word came that these two distinct user tribes would one day be united as a single "System/3X" nation.

### Untimely demise?

Even though a new product had been conceived, doubt remained among some that the machine would come into the world and grow to maturity. It could just as easily be killed in infancy, as a lot of research and development projects are.

But no benign father could overlook the 200,000 souls committed to System/34, 36 and 38 processors. Such a father would, like a shepherd, lead his users safely through the valley of the shadow of DEC.

At last, the consultant community has abandoned its false beliefs. Now, having discarded the 9370 as the chaff that bloweth away, consultants and users have been eager for stories relating to the coming One.

As for us humble scribes, it will no doubt fall to our lot to chronicle the doings of this Processor, so that its good jobs may be known throughout the world. It is in such readiness that we wait.

---

Gibson is *Computerworld's* senior editor, systems & peripherals.

# NEW PRODUCTS

## Data storage

The **UD23** disk controller, which is said to connect industry-standard enhanced small device interface disk drives to Digital Equipment Corp.'s Unibus, has been announced by **Emulex Corp.**

The quad-size UD23 implements DEC's Mass Storage Control Protocol to provide a software-transparent interface to the computer. The controller relieves the host of such file maintenance tasks as bad block replacement, seek optimization, command prioritization and ordering and data mapping.

The UD23 supports up to four physical or eight logical disk drives with clocks up to 15 MHz. Other features include a 32K-byte buffer, data-transfer rates of 2M byte/sec. and block mode direct memory access.

The UD23 costs $2,800.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626. 714-662-5600.

Two backup drives and subsystems have been introduced by **Megatape Corp.** and are available in versions for Digital Equipment Corp., Data General Corp., Apollo Computer, Inc., Sun Microsystems, Inc. and other computers.

The **MT-1500** provides a formatted



**Megatape's** *subsystems*

capacity of 1.2G bytes and a sustained data transfer rate of 764K byte/sec. The 8mm **GT-88** cartridge drive has a capacity of 2G bytes and a sustained data transfer rate of 246K byte/sec.

The MT-1500 high-performance drive costs $19,500; a medium-performance version costs $16,500. The GT-88 drive with a Pertec Computer Corp. interface costs $7,950.

Megatape, 1041 Hamilton Road, Duarte, Calif. 91010. 818-357-9921.

A small computer systems interface (SCSI)-compatible VMEbus interface board that provides sustained asynchronous data transfers up to 4M byte/sec. is currently available from **Plessey Microsystems.**

The **PME SCSI-1A** is compatible with the ANSI X3T9.2 SCSI specification for applications requiring intensive real-time disk I/O activity with a minimum of VMEbus loading. The product handles up to 16 concurrent tasks, simultaneous VME/SCSI transfers and direct memory access transfers up to 32 bits wide over the VMEbus.

The PME SCSI-1A interface board is priced at $1,495.

Plessey Microsystems, One Blue Hill Plaza, Pearl River, N.Y. 10965. 800-368-2738.

## Power supplies

**Para Systems, Inc.** has introduced the **Minuteman 1600** uninterruptible power supply. The unit is said to protect computer systems and other sensitive electronic equipment from interruptions such as blackouts, brownouts, overvoltages, overloads, surges, spikes and noise.

For systems with a maximum power load of 1,600W, the Minuteman 1600 includes a synchronized sine wave output that switches to inverter operation in less than 1 msec.

All operations are automatic, with sound and LED indicators.

The Minuteman 1600 costs $1,999.

Para Systems, P.O. Box 815188, Dallas, Texas 75381. 800-238-7272.

**Computer Power Products** has introduced a status and diagnostic monitoring system compatible with RS-232, RS-422 and RS-485 as a plug-in option for its line of rotary uninterruptable power systems and power line conditioners.

**The Digital Information System** is IBM Personal Computer AT compatible and, through the addition of optically coupled data modules, is capable of accepting 64 analog and 24 digital inputs.

The Digital Information System is priced from $1,900.

Computer Power Products, 227 E. Compton Blvd., Gardena, Calif. 90248. 800-421-6102.

## Input devices

**Document Technologies, Inc.** has introduced the **DP-200** and **DP-400 series Document Image Processor** workstations to add document image functionality to the numeric-, text- and graphics-based capabilities of data processing systems.

The DP-200 offers a 200 dot/in. resolution display. The DP-400 offers a 400 dot/in. resolution display. Prices range from $6,000 to $20,000.

Document Technologies, 2465 E. Bayshore, Palo Alto, Calif. 94303. 415-858-0372.


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**COMPUTERWORLD** *Extra*

An IDG Communications Publication

# Rating the vendors: Whose DBMS runs the fastest?

*An expert ranks 13 data base systems for speed, I/O traffic and request handling*

BY WILLIAM INMON

Two years ago, an article appeared in *Computerworld* discussing data base performance measurement by means of a standard metric — the maximum transaction arrival rate (MTAR). Since then, the world of data bases and the hardware that data bases run on have undergone significant change.

The speed and capacity of processors has increased, and data base vendors continue to improve the efficiency of their products. The world of performance measurement is significantly changed as well.

So once again, the popular data base management systems have been benchmarked — this time with a three-part metric that gives users a fuller, more accurate picture.

First, the results: From 1986 to 1988, the performance these data base systems can achieve has pushed upward fairly substantially. Increased hardware capability, more efficient software and a focus on the production environment have all influenced hardware and software vendors toward this end.

In terms of raw performance, hierarchical systems continue to dominate. Indeed, if anything, IBM's TPF and IMS Fast Path have increased their performance lead over what they were capable of in 1986.

Some users ask, Why use the maximum transaction arrival rate as a criterion for selecting a DBMS when few MIS shops ever need the full transaction performance capabilities of a DBMS? In other words, a shop that is going to do, at most, five transactions per second will not necessarily choose a DBMS capable of 100 over a DBMS that can do 25.

This argument is valid. But the MTAR rating of a DBMS is similar to the Environmental Protection Agency's mileage rating of a car: No one expects to actually achieve the mileage the EPA says is possible.

By the same token, no one expects a subcompact Toyota to use more gas than a four-wheel-drive Jeep or a Volkswagen bug to use more gas than a Cadillac.

In other words, the MTAR rating is relevant to every data base user because it describes the DBMS's efficiency of processing — even if the user is not worried about stretching the system beyond its capacity.

Inmon is a senior principal at American Management Systems, Inc., a consultancy in Lakewood, Colo.

## Hierarchy of needs

The fact is, there is a hierarchy of needs for an on-line system, and performance ranks first. As customers list their needs in an attempt to find DBMSs that meet them, their choices narrow. The order of these needs might go this way:

1. Is there a system that can execute my on-line processing?
2. Of the systems that can execute my on-line processing, which costs the least money?
3. For the system that has been chosen, how long does it take to develop that system?
4. For the system and development environment that has been chosen, how much is required in the way of resources?
5. What about availability, distributed processing and modularity (or graceful expandability)?
6. How user friendly is the system? How friendly is the development environment?

Looking at individual DBMS products, then, if a manager must execute on-line processing with very high volumes, the overriding concern is to be able to make the system work regardless of other operational or development costs. For managers facing the fear of not knowing just how high their processing needs will be, Tandem Computers, Inc.'s Nonstop SQL is a very attractive alternative.

If a manager has several hardware and software alternatives that can fulfill his on-line processing needs, he will select the one that entails the lowest long-term costs. For very high-performance systems, IMS Fast Path or TPF are attractive. For less high-performance systems, Software AG of North America, Inc.'s Adabas, Cullinet Software, Inc.'s IDMS/R, Applied Data Research, Inc.'s DatacomDB and Computer Corporation of America's Model 204 are very attractive.

If a manager has alternatives that satisfy his processing needs, and long-term operational costs are not excessive, then he can focus on the speed of development. IBM's DB2, Cincom Systems, Inc.'s Supra and others are very attractive to the manager at this level of the hierarchy.

If a manager has selected an environment and if the length of time it takes to develop the system is not excessive, then he can

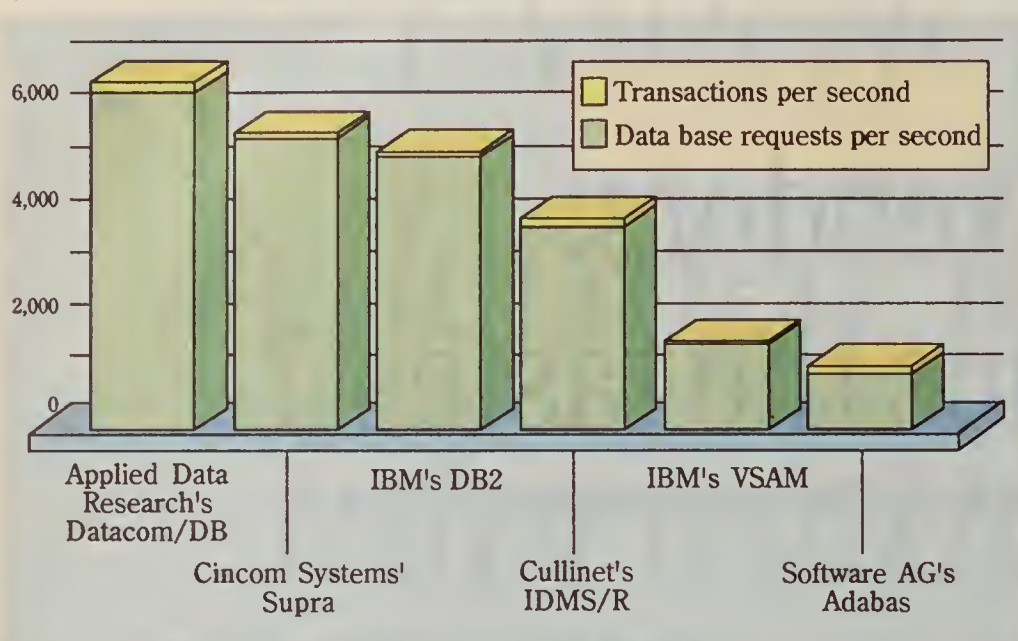


ROBERT WISNEWSKI

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## ADR's Datacom/DB highest performer

*Cincom's Supra shows second fastest speed among CICS-based data base management systems**




*All figures based on normalized processing for an IBM 3090 Model 400E

INFORMATION PROVIDED BY AMERICAN MANAGEMENT SYSTEMS, INC.
CW CHART

focus on how efficient the development process is. Most DBMSs are quite attractive at this level.

### How study was done

To determine the performance standings for 1988, a study was conducted by first contacting the top DBMS vendors. Laboratory observations were collected either through publicly available studies, such as those distributed at the Guide and Share users groups, or through studies conducted by the vendors themselves. In addition, some vendors supplied references of customers willing to share their performance results.

Unfortunately, it was not possible to run exactly the same application across all systems as a basis for comparison. One of the criticisms of using standard metrics for data bases is that they do not account for the unique processing of applications. Some applications simply run faster than others: Credit verification universally runs quickly, and bill of materials processing traditionally does not.

In fact, during the research for this article, an application turned up for which each data base request resulted in an I/O. The net result was that only 40 transaction/sec. were able to be run, even though the processor was an IBM 3090 Model 400E. But for another application, one in which the buffer was able to be used effectively, the same DBMS ran a significantly higher number of transactions per second.

However, it is generally safe to assume that the DBMS vendors that participated in the study did not choose a slow-running or poorly designed application to represent their products.

This study does not purport to be scientifically perfect or settle the issue of differences in applications and transactions. But in light of the paucity of information available, it is useful as a rough guideline to data base performance.

### Saturation point

As in the previously reported MTAR analysis, "maximum" means the highest number of transactions that the software can sustain on the largest processor it runs on. A transaction is defined as the interaction between a terminal and the computer — the user at the terminal initiates a transaction, the transaction is passed to the computer, data base access ensues, and transaction output is sent back to the terminal.

In the ideal transaction profile, the ratio of update processing to inquiry processing is about 1-to-6 — that is, 15% of the work load is update, 85% is inquiry.

The MTAR is simply the point at which the processor and the DBMS can no longer accept transactions to execute because hardware or software facilities are saturated. The incoming transaction is then queued and must wait for machine and DBMS resources to be free.

But the MTAR addresses only one aspect of performance: transaction processing. Two other measures are equally important:

- The on-line data base requests that the DBMS is handling at the high-water mark of transaction processing.
- The ratio of data base requests to physical I/O that is required to satisfy the language request.

A data base request, for the purposes of this article, is the number of times the data base — either on a direct-access storage device or in the buffer — must be accessed to satisfy a request from an on-line application program, including index and overflow access.

For example, in a record-at-a-time DBMS such as IMS, in which randomization of data is used, there is usually a close correlation between a user's request for data and a data base request. In IMS, when a user wants an accounting record, the data base request is satisfied with one entry into the data base.

In contrast, in a set-processing DBMS, the user issues a single data base call for a set of data that may require many entries


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into the data base. For example, in IBM's DB2, the user might wish to find out how many employees have college degrees. To satisfy this single SQL request, an indeterminate number of data base requests would be made, including index access.

So the rate at which data base requests for on-line processing can be satisfied at peak periods of transaction processing serves as a good measure of data base performance, along with the MTAR. Note that data base requests do not distinguish between READs, WRITEs and so forth. Instead, if a WRITE causes four accesses to be made to the data base, four data base requests will be counted.

### Role of the buffer

The other measure of data base performance is the ratio of data base requests to physical I/O that is required to satisfy the language request. High-performance data base applications often satisfy many data base requests in the buffer area and require very few physical I/Os.

One caveat: the ratio of I/O requests satisfied in the buffer is usually a function of system tuning, volume of processing being run and the nature of the application itself, as well as being a function of the DBMS's efficiency.

Looking at all three of these measures in a balanced way eliminates the bias of an application that does practically no data base processing and, consequently, appears to run very quickly, and the bias of a transaction that does little transaction processing but massive data base processing. So whether the MTAR is very high and the data base requests serviced remain low, or vice versa, users can evaluate DBMS performance on a fair scale.

### So, who won?

The results of the research are shown in tables (see charts pages 84 and 85). The tables reflect the current release of each DBMS, and they list the following information about the benchmarked case:

- Whether it was a laboratory case or an actual production application.
- The processor the measurement was taken on or estimated for.
- The published MIPS rating for the processor.
- The percentage of system resources used to run IBM's MVS at the time the observation was taken, including DBMS and other utilization.
- The percentage of system resources used to run the DBMS and teleprocessing monitor.
- The number of transactions per second observed at the high-water mark.
- The total number of data base requests being serviced per second at the high-water mark.
- The amount of physical I/O being generated per second at the high-water mark.

Some columns show "normalized" processing. This is calculated by adjusting all processing rates up to a 3090 Model 400E running at 61.5 million instructions per second (MIPS). A simple linear extrapolation is used.

So if a benchmark is run for a 30.75 MIPS machine, the rates are merely doubled to reflect processing on a 3090 Model 400E. This, of course, in practice may be an incorrect calculation. For example, it would be inaccurate if the DBMS could not take advantage of single-image processing when the upgrade in processing power involves a change from a uniprocessor to a dyadic processor.

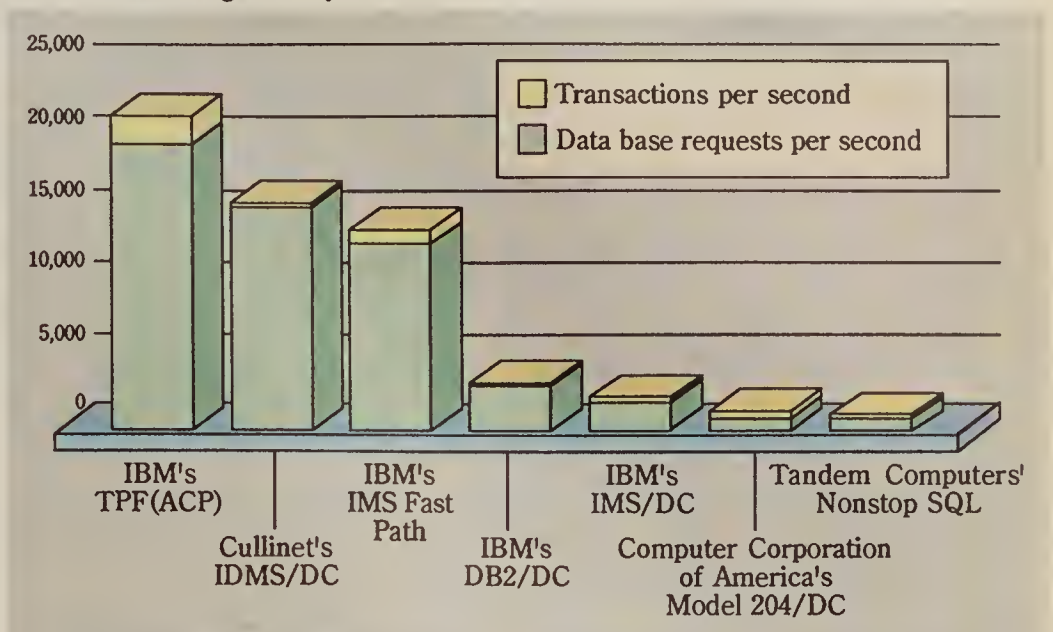
Another inequity occurs when only a fraction of the MIPS is being used by the actual application. When only 25% of a processor is being consumed, it may not be realistic to multiply the processing rates by a factor of four to project results for the 3090 Model 400E architecture.

In other words, it is not possible to extrapolate performance upward based on an observation that shows only a fraction of usage of a 3090 Model 400E when the observation was made on another machine that does not share the same

*Continued on next page*

## IBM's TPF still fastest

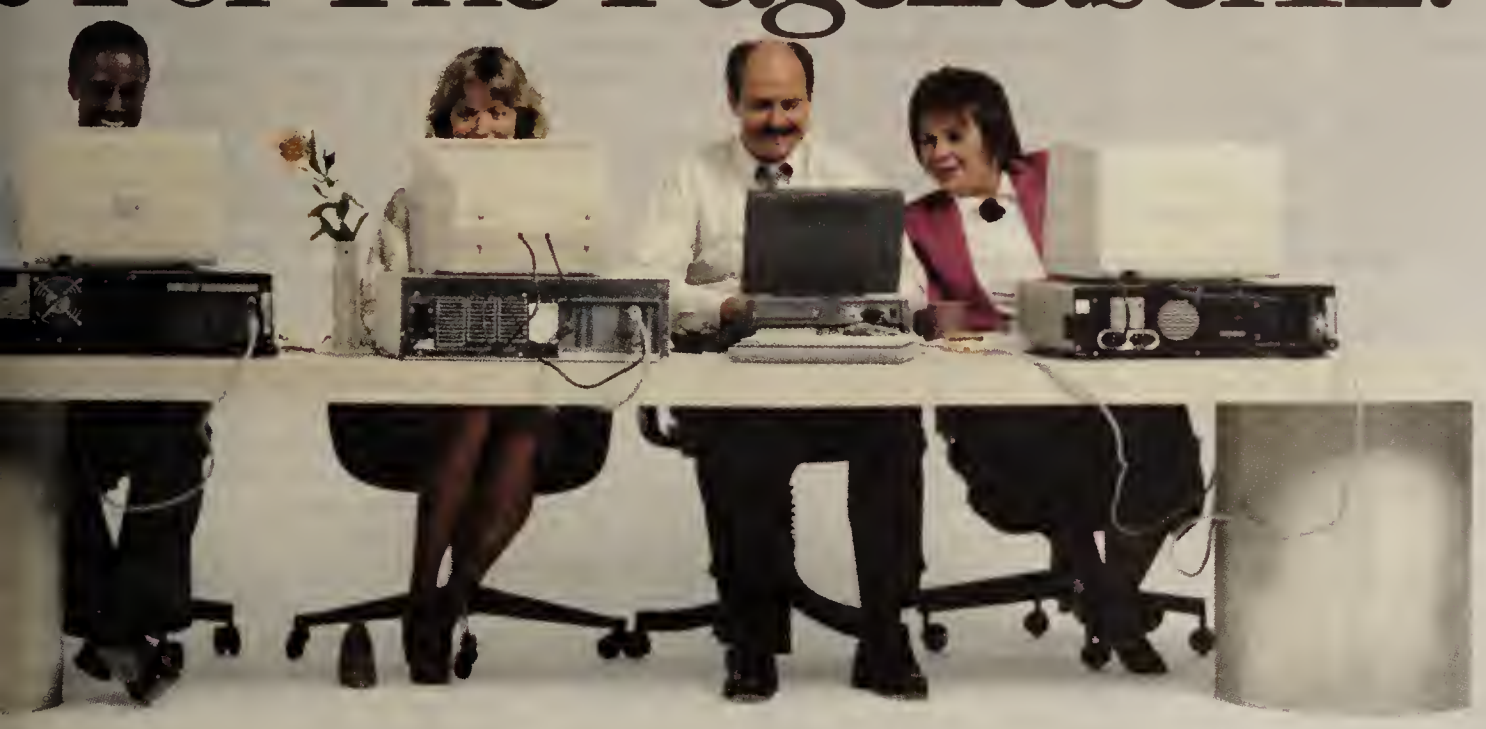
*Cullinet's IDMS runs a close second for high performance among non-CICS data base management systems**




*All figures based on normalized processing for an IBM 3090 Model 400E

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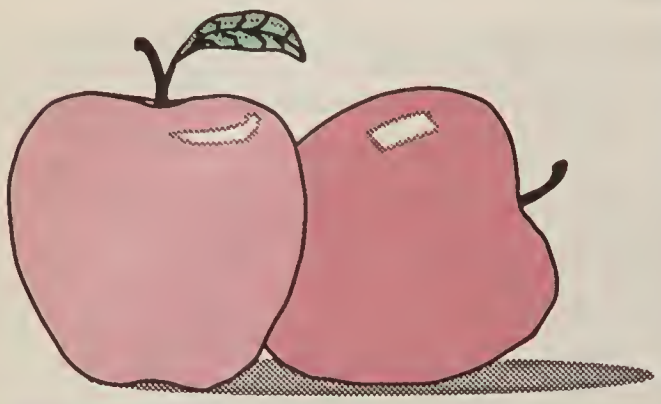
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## Data bases under CICS — how fast will they run?

*Results from observed benchmarks are normalized so readers can compare apples to apples*



| Product | Vendor | Base data — Observed benchmarks: Laboratory case (L) vs. actual application (A) | Processor | MIPS | Amount of CPU used by IBM's MVS | Amount of CPU used by data base management system and teleprocessor | Transactions per second | Data base requests per second | Physical I/O per second | Normalized processing for an IBM 3090 Model 400E at 61.5 MIPS[1]: Transactions per second | Data base requests per second | Physical I/O per second |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Adabas[5] | Software AG | A | Amdahl 5880 Model 300 | 26 | 13% | 54% | 53 | 300[2] | 60 | 187 | 1,059[2] | 212 |
| Datacom/DB[5] | Applied Data Research | A | IBM 3090 Model 400E | 61.5 | 10% | 40% | 100 | 3,200 | 800 | 200 | 6,400 | 1,600 |
| DB2[3 5] | IBM | A | IBM 3090 Model 200E | 31.2 | 20% | 78% | 62 | 1,711 | 572 | 126 | 3,440 | 1,162 |
| DB2[5] | IBM | L | IBM 3090 Model 200 | 27.7 | 19% | 75% | 47 | 2,208[2] | 368 | 111 | 5,211[2] | 816 |
| IDMS/R[4] | Cullinet | A | IBM 3090 Model 200 | 27.7 | 4% | 20% | 21 | 546 | 138 | 150 | 3,879 | 980 |
| Supra[4] | Cincom Systems | A | IBM 3090 Model 400E | 61.5 | 5% | 20% | 16 | 694 | 174 | 128 | 5,551 | 1,388 |
| Supra[5] | Cincom Systems | A | IBM 3090 Model 200E | 31.2 | 10% | 40% | 30 | 403 | 96 | 120 | 1,613 | 381 |
| VSAM[5] | IBM | L | Amdahl 5890 Model 200 | 33.6 | 20% | 80% | 44 | 883 | 530 | 82 | 1,617 | 971 |

[1] Millions of instructions per second
[2] Estimated
[3] Shows some characteristics of a laboratory example
[4] Benchmarks showing less than 50% utilization were extrapolated up to 80% total (including MVS) utilization
[5] Benchmarks showing 50% or more utilization were extrapolated up to 100% total (including MVS) utilization

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# Have you locked your data today?

There are many reasons that performance suffers in some data base management system environments. The locking of data is one major reason.

Some industry literature claims that IBM's DB2 has the same levels of locking as the company's IMS Fast Path. In the sense that Fast Path locks data at the data base record level and that DB2 locks data at the page level, this is true. But this perspective misses a much more important point: DB2 still requires many more resources than Fast Path to lock the same amount of data.

Consider the following example: a simple data base design in which groups of Data A, B, C and D are related (see chart at right). Fast Path's hierarchical nature is reflected in the organization of data in the same data base record. To lock all of A, B, C and D in IMS Fast Path requires that only one block of data be locked. If there is a lot of data in the four groups and overflow is required, then perhaps two or three physical blocks are locked.

In DB2, when the data has been normalized, A, B, C and D exist in separate tables, assuming the data base is the size of a production data base, not a "toy" data base. Each table requires an index to get into the data efficiently. In short, the physical separation of DB2 data — the key to DB2's flexibility — requires that at least four pages of data be locked to Fast Path's one block. Both examples are best-case scenarios.

But there is no guarantee that when occurrences of B, C and D are related to the same A that they will be stored in the same physical page. Suppose A is related to $B_1$, $B_2$ and $B_3$. Unless B is clustered properly, there is a good chance that $B_1$ will be in Page N, $B_2$ will be in Page M and $B_3$ will be in Page O. The same holds true for the physical placement of C and D. If there are many occurrences of B, C and D, it is probable that many pages will be locked in DB2. Furthermore, when a page is locked, all rows in that page are also locked, thus tying up data that has no relation to A. The result is a lot of awkward locking.

Of course B, C and D could be clustered to optimize the access of data in conjunction with the accesses of A. But B, C and D can be clustered only once. The flexibility of the relational model depends on the ability to create relationships dynamically.

If B, C and D are clustered to optimize their relationships with A, then B, C and D will not be optimized for E, F or G. You could say the same thing about Fast Path, but it does not advertise flexibility as one of its primary selling points.

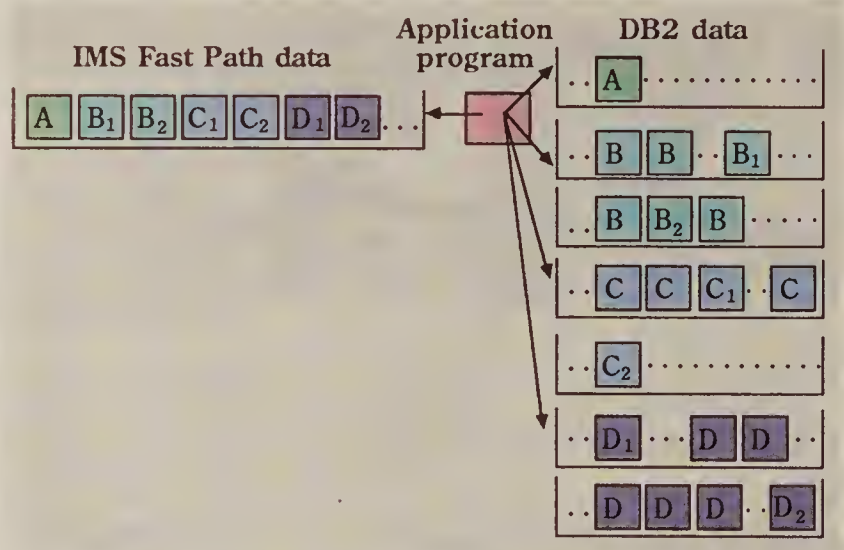
DB2 is based on the relational model, but it is DB2's fidelity to that model that reduces its performance in the case of data locking. Of course, it can be argued that the DB2 application design could be bastardized to achieve higher levels of performance. But that implies that the relational model, to which DB2 conforms, be significantly modified to achieve good performance.

Ultimately, this type of performance degradation is not limited to DB2. Other products that adopt the same approaches as DB2 face the same fundamental impediments to performance.

WILLIAM INMON

### Locking slows down DB2

*Physical separation of DB2 data requires that four pages of data be locked – to IMS Fast Path's one block – in this unsequenced example*




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# Rating

FROM PRECEDING PAGE

characteristics as a 3090 Model 400E. The purpose of the extrapolation is merely to provide a basis for common comparison.

### No surprise at all

Across the board, laboratory observations outperformed real-life applications. In previous studies, laboratory examples outpaced real applications by a ratio of up to 5-to-1. We must be careful to distinguish between the two because, for better or worse, there is an air of unreality in all laboratory benchmarks.

Also for greater accuracy, IBM's CICS was separated from other teleprocessing monitors when possible, because strict CICS comparison is perhaps the fairest measurement of data base performance.

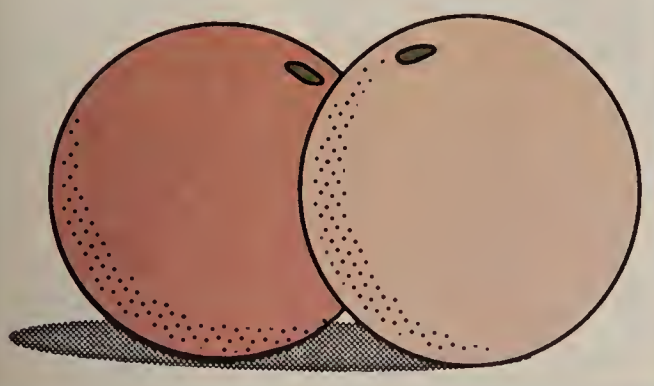
One interesting entry in the transaction processing arena is Tandem, which has a very different architecture than the IBM 370. The company has performed a benchmark that hit 208 transaction/sec. in a standard transaction operating environment using Nonstop SQL distributed relational DBMS.

For MIS managers who worry about exceeding the MTAR, Tandem is an attractive choice because the DBMS's transaction rate is so high and because Tandem can increase the rate by adding more processors in a networked manner.

But excessive volume is only a manager's first concern. Robustness is another. To make a comparison between data base systems running on Tandem architecture and those running on IBM architecture, the processing capability per MIPS is "normalized." Now, there is an inequity in this comparison: It is very likely that Tandem's 1 MIPS does not equal IBM's 1 MIPS. In fact, 1 MIPS on a Tandem machine is probably somewhat less robust

## Non-CICS data bases — how fast do they run?

*Results from observed benchmarks are normalized so readers can compare oranges to oranges*



| Product | Vendor | Base data — Observed benchmarks: Laboratory case (L) vs. actual application (A) | Processor | MIPS | Amount of CPU used by IBM's MVS | Amount of CPU used by data base management system and teleprocessor | Transactions per second | Data base requests per second | Physical I/O per second | Normalized processing for an IBM 3090 Model 400E at 61.5 MIPS[1]: Transactions per second | Data base requests per second | Physical I/O per second |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DB2/DC[5] | IBM | L | IBM 3090 Model 200E | 31.2 | 20% | 80% | 53 | 1,590[2] | 398[2] | 106 | 3,180[2] | 795[2] |
| IDMS/DC[5] | Cullinet | L | IBM 3090 Model 200 | 27.7 | 10% | 50% | 105 | 4,284 | 231 | 373 | 15,218 | 820 |
| IMS/DC[5] | IBM | L | Amdahl 5890 Model 200 | 33.6 | 20% | 80% | 106 | 1,198 | 1,390 | 194 | 2,192 | 2,543 |
| IMS Fast Path[5] | IBM | L | IBM 3090 Model 400E | 61.5 | 20% | 80% | 1,062 | 12,744[2] | 5,841[2] | 1,062 | 12,744[2] | 5,841[2] |
| Model 204/DC[4] | Computer Corporation of America | A | Hitachi M780H | 30 | 4% | 18% | 60 | 87 | 66 | 547 | 793 | 601 |
| Model 204/DC[5] | Computer Corporation of America | L | IBM 4381-3 | 4.8 | 18% | 52% | 80 | 632 | 126 | — | — | — |
| Nonstop SQL[3 5] | Tandem Computers | L | Tandem Nonstop VLX[6] | 96 | —[3] | 93% | 229 | 1,603 | 1,040 | 147 | 1,027[2] | 662[2] |
| TPF (ACP)[5] | IBM | L | IBM 3090 Model 180 | 15.6 | 20% | 80% | 500 | 5,000[2] | 2,500[2] | 1,970 | 19,700[2] | 9,850[2] |

[1] Millions of instructions per second
[2] Estimated
[3] Not MVS-based; different hardware architecture
[4] Benchmarks showing less than 50% utilization were extrapolated up to 80% total (including MVS) utilization
[5] Benchmarks showing 50% or more utilization were extrapolated up to 100% total (including MVS) utilization
[6] 32-processor configuration

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CW CHART

than 1 MIPS on an IBM machine, but exactly how much less?

Also biasing the comparison is Tandem's approach to managing data, which is markedly different from the approach IBM has traditionally taken. So in general, making a comparison based on MIPS is a difficult one.

However, if the Tandem environment is normalized — that is, converted to the 61.5 MIPS equivalent, as the other products are — the result is still illuminating, if imprecise. Tandem uses more processing power than IBM, which is not surprising, given Tandem's architecture.

### What about Oracle?

Oracle Corp.'s DBMS product was not included in the study. There is a paucity of information about Oracle's performance in the MVS environment, perhaps because in that arena, it is a new product with only a limited customer base. The only publicly available performance information was a benchmark comparison from Monsanto (CW, Nov. 23, 1987). In it, Monsanto stated that Oracle proved to be very marginally less of a performer than DB2 in all of its transaction processing tests.

One of the most interesting benchmarks encountered in the course of the study was a laboratory benchmark run on an IBM 3090 Model 200 in which DB2 was run up to 100 transaction/sec. doing one data base request and one physical I/O per transaction. In some ways, the best measurement of performance is exactly this case: in which the transaction rate is run as high as possible and only one I/O is done.

This measurement, which was not encountered for other vendors, is a good basis for a best-case analysis of a DBMS's transaction performance.

Across the board, the difference between the high-performance software packages and the lower performance packages lies in these factors:

- Integrity — both transaction and data base integrity.
- Flexibility. In terms of performance, this feature is not cheap: The higher the performance, the less the flexibility.
- Record-at-a-time processing vs. set-at-a-time processing. The indeterminate resources used by set-at-a-time processing hamper the consistency of performance.
- Teleprocessing monitor interface. Obviously, some are faster than others.
- Basic access and the physical organization of data. Here, direct access of data through a randomizer is faster than indexing data.
- The ability to do processing in main memory. For small data bases, avoiding I/O completely can enhance the speed of transaction processing.

### Don't judge by the cover

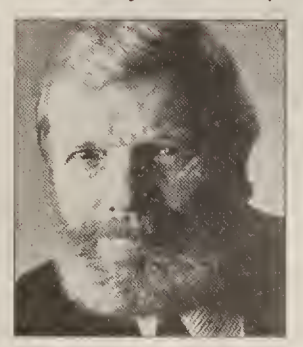
Of course, performance is only one aspect of data base systems. It is unquestionably one of the most important aspects, but there is more to any purchase decision than performance.

DBMSs compete for buyers' attention on a number of other counts, including the suite of development tools that surround the DBMS, data dictionary support, flexibility, security, portability and the long-term prospects for the vendor.

As software continues to mature, it will be interesting to see whether the gains DBMSs have made in transaction processing performance can be sustained. •


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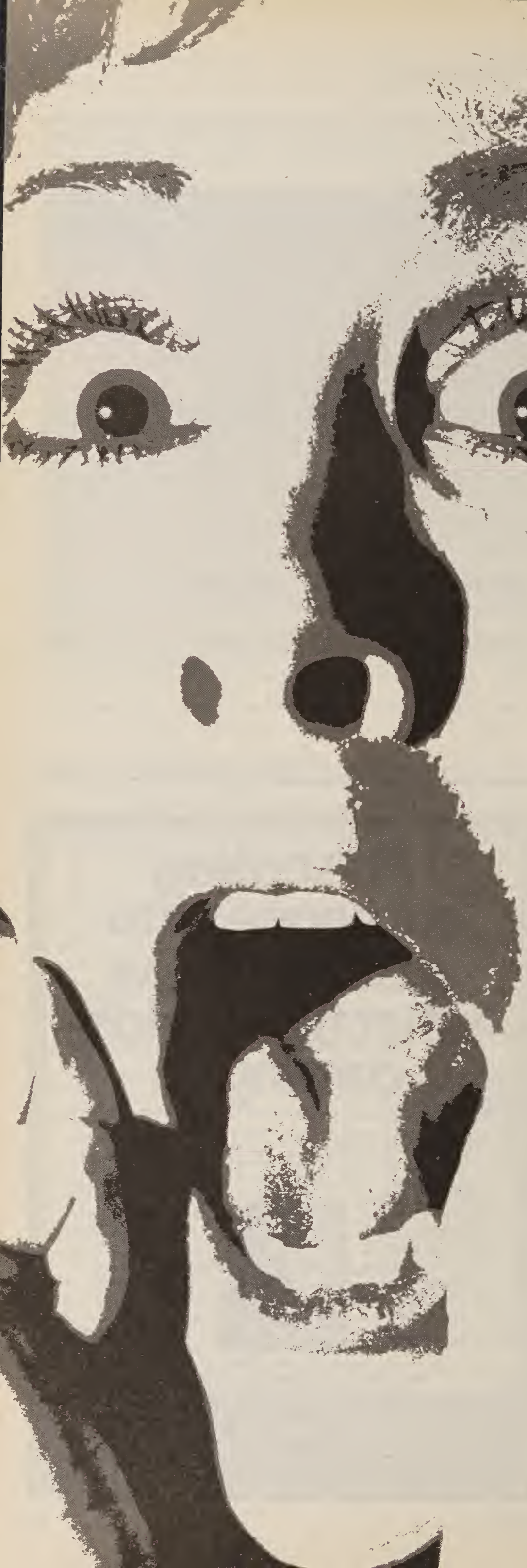
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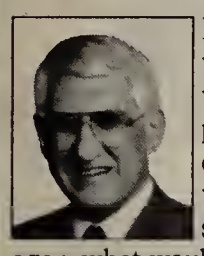
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# MANAGEMENT

TAKING CHARGE

*Les Gilliam*

## Survey says: Use a survey



If a survey were taken today of the primary problems encountered by the information systems manager, what would the response be?

Perhaps topping the list would be the lack of direction from upper management or, more likely, a lack of understanding or appreciation. Next might be the difficulty in meeting application development schedules. Somewhere else on the list would be high turnover and low morale. Constant stress and pressure would no doubt be mentioned. And always present on such a list would be the inability to satisfy the users.

Had such a survey been taken last year, or any time over the past 30 years, the answers would have been essentially the same.

Why does the information systems manager continue to fight these problems? Are there root causes? How can the systems group increase productivity, improve morale, decrease turnover and earn a gold star from both the users and top management?

Space does not allow a discussion of all the possible causes or solutions. But there seems to be one common denominator that most MIS shops have been unable to conquer. It can be identified, in general, as a lack of communication.

*Continued on page 93*

## Garber offers know-how

BY ELISABETH HORWITT
CW STAFF

Jack Garber firmly believes in the value of learning from experience — particularly harrowing sink-or-swim experiences that force people to develop new skills and make hard decisions in a hurry.

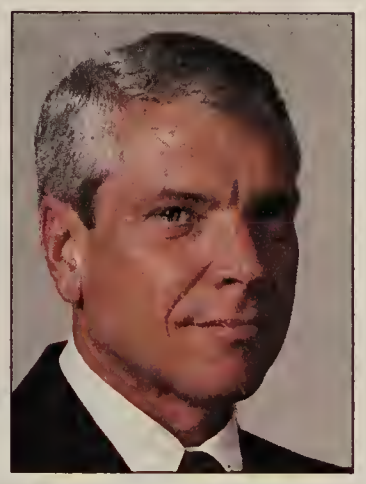
When he took over Fidelity Investments, Inc.'s telecommunications services group last spring, Garber brought to the job the know-how gleaned from some 18 years of challenging work in the data processing and communications fields. He has set himself the goal of instilling in his staff some of the lessons he gained from his experiences.

With lean, sharply defined features and a no-nonsense haircut, Garber at first comes across

*Continued on page 94*

PROFILE

Jack Garber



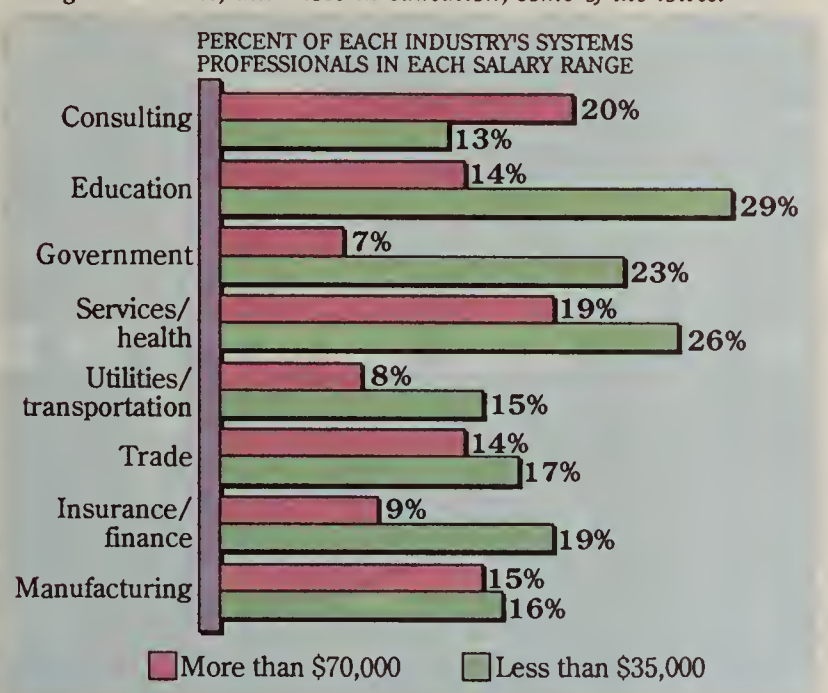
**Position:** *Director of Fidelity Investments, Inc.'s telecommunications services group.*

**Mission:** *To instill in Fidelity's telecommunications staff a sense of responsiveness to the 19 divisions they service.*

## Data View

Go consulting, young man

*Systems personnel in consulting companies draw some of the highest salaries, and those in education, some of the lowest*




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MANAGING TECHNOLOGY

## Ready or not, here comes AI

BY SUSAN MESSENHEIMER
SPECIAL TO CW

"But it wasn't my idea," might be an all-too-familiar MIS manager's retort to a probing question about an artificial intelligence project. In fact, AI specialist Dave Linegar says, less than 25% of the 1,000 corporate AI projects he researched were generated by MIS.

But no matter who plants the AI seed — a bigwig at the top or a technically oriented middle manager in need of an expert system — AI *is* high technology, and MIS will have to become involved in one way or another.

Before letting your company run blindly into an AI project, make sure that it's truly necessary. Are highly technical skills involved? Is information subject to constant revision and update? Do experts spend a great deal of time giving consultations and advice?

Let's say you answer yes to enough of these questions so that you decide to launch an expert system development project. Now what?

### Follow the leader

Linegar, co-author of *How Corporate America is Changing: The Inside Story on Expert Systems*, points out that the successful implementation of expert systems in many large organizations follows a particular scenario. "There must be top-down support for the introduction of advanced technology," he explains. "This translates into money, people and corporate culture information."

Linegar has observed AI endeavors at such firms as American Express Co., Federal Express Corp., Digital



MARK BRAUGHT

Equipment Corp., The Boeing Co., United Airlines and Security Pacific Corp.

"Most successful groups form around a core person, a champion — he or she becomes the AI manager or the tech center director," he adds.

"This person is someone who's familiar with the company and its culture, who may have held a number of positions and who can create an old-boy network," Linegar points out. The core AI person should also identify others in the firm who may be interested in the technology.

*Continued on page 90*


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# Arming the data center for corporate warfare

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Now that many business information systems are seen as competitive weapons, MIS managers need to evaluate their projects in militaristic terms to see if they will win the battle, according to a University of Dallas professor and MIS consultant.

At a conference late last month, Robert H. Dunikoski said there are five questions MIS managers should ask about information systems that are intended to boost the business's competitive situation:

- Is it an offensive or defensive weapon?
- Is it an effective or ineffective weapon?
- Do the MIS department's foot soldiers have the skills needed to carry out the engagements?
- Is the commander in chief committed to the use of information systems to fight the competition?
- Is the company engaged in guerrilla warfare or strategic strikes?

> "YOU MIGHT be dragged into competitive warfare whether you like it or not."
>
> ROBERT H. DUNIKOSKI
> MIS CONSULTANT

### DP enlistment

Competitive information systems need top management commitment because they can be very expensive, and they need an experienced army of foot soldiers, Dunikoski said. "There is a danger of putting weapons into inexperienced hands . . . they could backfire," he said.

Dunikoski spoke at a joint meeting of the Institute of Management Sciences and the Operations Research Society of America, held in Washington, D.C. He is an MIS consultant to several Dallas-area corporations and an assistant professor at the University of Dallas Graduate School of Management in Irving, Texas.

"You might be dragged into competitive warfare whether you like it or not," the speaker warned.

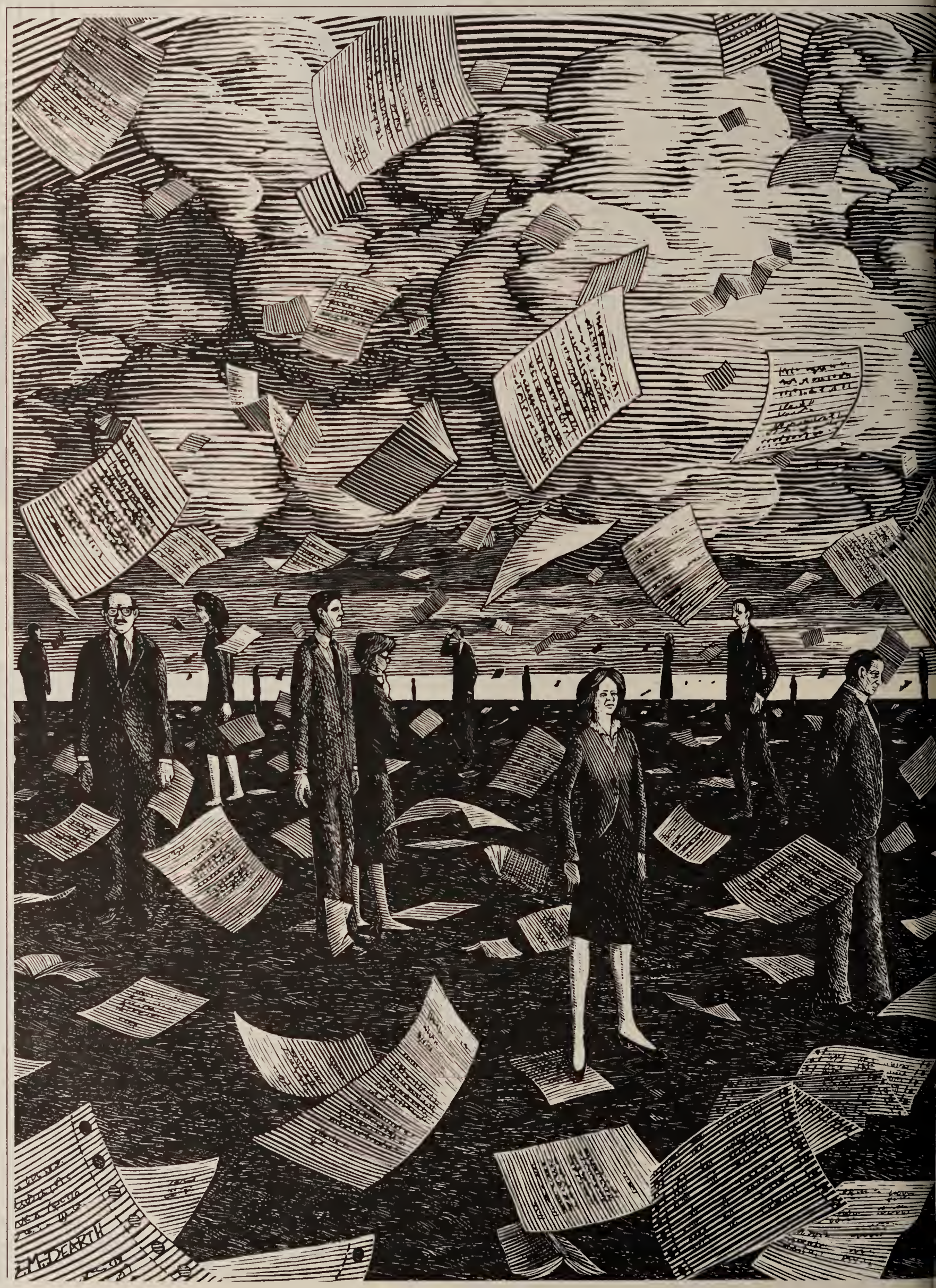
For example, when American Airlines developed its computerized reservation system, competitors such as Delta Air Lines were forced to develop their own systems in order to catch up. "They had to respond in a very defensive posture," Dunikoski recalled.

The next competitive step for the airlines may be to use technology to bypass travel agents and deal directly with large corporate customers, predicted another speaker, William J. Doll, a professor of MIS and strategic management at the University of Toledo in Ohio.

The technology involves so-called satellite ticket printers, which would allow the airlines to transmit ticket information via modem to printers at customer offices, Doll explained. "Even if this bypass approach is used for only a few hundred major corporate accounts, it would have a major impact on many travel agencies," he said.

In addition, expert systems may someday be used in the travel agency business to make reservations, prepare itineraries and perform corporate travel audits, Doll said. If these developments occur, he said, the result will be that only the large travel agencies, which have enough business volume to afford the technology and training, will survive.

"As the industry becomes increasingly complex, it will become difficult for small mom and pop agencies to compete effectively," Doll concluded in a paper he presented at last month's conference.



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# Weighing the managerial pay scale

*Broad salary discrepancies found in nationwide System/38 sites*

BY JAMES CONNOLLY
CW STAFF

DES MOINES, Iowa — They deal with the same technology and are paid with the same U.S. dollars, but MIS managers at IBM System/38 sites report salary discrepancies of up to 96% based on their education, location, industry and how well they do their jobs.

Even with an average salary of $44,250 and a median salary of $42,900 for managers of System/38 shops, a recent survey of 132 managers responsible for the minicomputers uncovered broad discrepancies. The widest gaps lay between the upper 20% of the pay scale — at which the average salary reached $62,120 — and the lower 20%, at which managers earned an average of $31,645 in 1987.

The survey was conducted by Des Moines-based personnel recruiter Nate Viall & Associates, which specializes in the System/38 arena.

According to company owner Nate Viall, the difference between the highest and lowest salaries reflects a maturation in the System/38 environment during the past two or three years, with companies competing for quality personnel — in particular, candidates with broad views of business.

### Talent show

"The talents in the System/38 world are being separated now," he said. "The ones who are making a contribution are being taken care of, while those who are just doing a job aren't."

Viall speculated that managers with System/38 experience will be in demand after IBM announces its System/36 and 38 follow-on, Silverlake. He said Silverlake could mean good job prospects for new college graduates familiar with the SQL-type data base access language expected in Silverlake.

Viall said almost all of the responding managers had more than five years' experience in the systems field and generally came from companies located east of the Rocky Mountains.

On a geographical basis, the highest salaries were reported in the Northeast, with an average of $64,499. In what Viall called the Rust Belt of Michigan, Indiana and Ohio, salaries averaged $40,227.

Advanced education tends to help managers earn more — $55,640 for respondents with MBAs — but not always. Graduates of technical schools — perhaps building on a broader skill base, according to Viall — averaged $42,362 and out-earned many college graduates, including those with bachelor's degrees in computer science. In addition, the lowest paid managers, at an average of $37,333, were those with Ph.Ds.


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# Ready or not

FROM PAGE 87

The company AI champion should create a task group of enthusiastic employees, including at least one or two from MIS. This group will serve as the source of information about knowledge-based systems for the entire organization. The task group should maintain a library of information — newsletters, magazines and books — on AI and expert system vendors, consultants, products and users groups.

The group should also conduct in-house seminars to educate those with an interest in the technology and generate interest among the rest. Most importantly, the task group's mandate should be to assure that the organization's AI/expert system development efforts are focused and directed; to that end, the group should be prepared to identify problems requiring expert systems and select appropriate software and hardware tools.

### Business sense

Du Pont Co., for example, has an AI focus group that is composed of experienced business professionals competent with expert systems technology rather than technical specialists, according to Robert Keller, president of Harvard, Mass., AI consulting firm Renaissance International Corp. and a consultant who has worked with Du Pont.

Notably, this approach implies that before a corporate-mandated AI endeavor began, the organization conducted various low-level, ad hoc efforts, producing business professionals familiar with expert system techniques. Keller confirms this, pointing out that Du Pont does much of its AI work with personal computer-based software tools.

"The AI focus group," Keller says, "is the equivalent of the information center."

Others say that more formal, extensive AI training is necessary for effective corporate expert system development.



**GTE's Worrest**

Michael Mushet is manager of technology research in the information services department of Southern California Edison Co. He says his organization knew it would be developing large, mainframe-based applications, so it conducted an internal search for employees with solid analytical skills who dealt well with high levels of abstraction and had "a high degree of intimacy with various AI models and ways of approaching AI problems."

At GTE Laboratories, Inc. in Waltham, Mass., the approach is similar, according to Ralph Worrest, a senior technical staff member. At GTE, AI is used in research projects that tend to be expansive, expensive and long-term. Like Southern California Edison, GTE employs a wide range of AI hardware and software; its AI development efforts are focused on large, complex systems, and the company's people are technically knowledgeable in AI.

### Training

Whatever the level of technical expertise, the entire AI task group must be educated, which very often will occur at seminars conducted internally or outside by vendors, consultants or universities.

Functional competence with a PC-based expert system tool often can be achieved in a few days; learning to knowledge-engineer high-end tools, like Intellicorp's KEE or Inference Corp.'s ART, takes longer — anywhere from four months to a year. At Boeing, Linegar explains, the company trains interested AI proponents in what it calls its Associate Program — following a year of intensive training, employees are sent back to their groups to implement a particular system.

Mushet points out that Southern California Edison apprenticed several employees to Texas Instruments, Inc., where they learned how to build an expert system.

### Picking a project

Your organization's first foray into expert system development should be modest — if it fails, the cost should be cheap.

"Look for a pilot application that is appropriate to the flavor of the technology you will use," Mushet advises. "If the problem selected is highly graphical, don't attempt to use a mainframe-based AI tool."

One source of pilot applications is your corporation's business units. Ideas should surface at seminars conducted internally by the AI task group. Contrary to popular belief, MIS may not be involved in any way in the application chosen for an AI project.

What constitutes the best expert system development tool or environment depends, of course, on the problem.

With the low-end, PC-based expert system tools, it's pretty straightforward, according to consultant Keller. "Most of the PC tools are about the same," he says.

It's a bit more complicated at the high end. According to Linegar, "If you're beginning work on a big project, send out invitations to a vendor roundtable. Have the vendors come in and discuss how they'll solve your problem, how long it'll take and how much it'll cost."

But there can be danger in thinking too big. "It's folly to think that corporate America is out searching for knowledge engineers," Linegar says. "The majority of expert systems are not being built by knowledge engineers." For most AI projects, it's someone in MIS who actually does the coding.

"I wouldn't suggest running out and buying really expensive equipment," Southern California Edison's Mushet adds. "I'd cut my teeth on something less expensive. You can get into expert systems with a personal computer and a $100 software package. It's like any new technology: You do not spend the money until you know what it is you're buying."

### Picking an expert

Some development projects — often the larger and more complex undertakings — require human expertise to be knowledge-engineered into the expert system. This in turn requires a patient expert who is willing to work with the knowledge engineers.

"You need a good relationship with these people," GTE's Worrest stresses. "They must be articulate and have the support of their management. In our experience, the experts had to give us one-quarter of their working time."

And just how do you find such an expert? "Look for the person who has the least amount of time to give you — that's probably who you want," Worrest suggests.

---

Messenheimer is the president of Natick, Mass.-based AIM Consulting & Publications, Inc.

## Getting into AI

*Estimates of the time and cost required to develop expert systems*

| System size | Number of rules | Development time | Project cost |
|---|---|---|---|
| Very small (prototype) | 50 to 100 | Approximately 0.2 man-years | $20,000 |
| Small | 150 to 400 | Approximately 0.5 man-years | $40,000 to $60,000 |
| Medium | 500 to 3,000 | One to two man-years | $500,000 to $1M |
| Large | More than 5,000 | Three to five man-years | $2M to $5M |

INFORMATION PROVIDED BY *EXPERT SYSTEMS: THE KEY FACTS FOR DECISION MAKERS*, BY TONY OWEN, CRANFIELD PRESS
CW CHART

## Both sides of AI coin

Setting up an artificial intelligence project could be the best thing your company ever did. But there can be corresponding pitfalls, so watch your step and pay special attention to the following issues:

- **The wrong people.** It is tempting to populate an AI task group with techies, but, notes Michael Mushet, manager of technology research at Southern California Edison Co.'s information services department, "a technical person or an AI researcher might lose sight of the fact that what they are supposed to do is solve business problems. Also, if they're too technical, they could turn off potential end users."
- **The right application.** First, beware of choosing an application that is not appropriate for the tools you have; second, beware that the human expert you turn to might perceive the expert system as a threat to his job; and third, beware of the urge to build a really important expert system, because if it fails, you could bring down the house.
- **Bad systems development.** Personal computer-based development tools are so easy to use that sometimes developers neglect good system development practices. The resulting seat-of-the-pants programming can be a nightmare. "Make sure the individuals developing the system are made aware of the issues of good systems methods," says Robert Keller, president of Harvard, Mass.-based AI consulting firm Renaissance International Corp.
- **Realistic client expectations.** Expert system development requires more involvement by the end user or client, and the process of building an expert system is, by nature, iterative; the developer is frequently returning to the client for more understanding of how the problem is solved and why. This breeds client expectations that may far exceed the capability of the finished expert system. "You must manage the expectations of the client," Mushet says.

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# ASM goes back to school for program expansions

BY JAMES CONNOLLY
CW STAFF

SAN DIEGO — The time has come for the 8,000-member Association for Systems Management (ASM) to build on the organizational foundation established in recent years by expanding and improving its educational programs, according to ASM's outgoing president.

ASM's challenge is to use that base to educate members on the rapid changes in information technology in an era during which businesses stress the need for strategic information systems, ASM President Steve Adamson said at the recent ASM annual conference here.

Adamson said ASM's charter — to educate its members — has not changed in the 40 years since it was founded as the Systems and Procedures Association, which focused on noncomputer issues such as paper forms and office work flow. He said that what may change is the focus of the education and how it is delivered as the importance of strategic systems is stressed.



**ASM's Adamson**

Most ASM members are involved with computers today, although the group has a broadly based membership. Those attending the conference here were mainly system designers and analysts.

Contrasting his organization with groups such as the Data Processing Management Association, Adamson said, "We tend to be systems professionals more than data processing professionals. We tend to be more involved with end users of an organization than some of the other associations — less involved in operating the DP equipment."

He said businesses' demand for competitive systems could help ASM members. "If our members are doing their jobs well, they will have a better understanding of the business than a person who is in a more purely technical job. I think that should give them a leg up," Adamson said.

Adamson, a Fullerton, Calif.-based management consultant, will complete his one-year term as president next month.

For those planning a career in information systems, he said, "I'd advise someone to be as well-grounded as possible in business fundamentals that are unlikely to change, in systems concepts, mathematics and psychology."

Expanding on psychology, he said, "Understanding people is the most important part of our job. We achieve things in some cases in spite of those people and in other cases by building on the positive in them."

Adamson said changing technology presents a challenge to ASM. "We are trying to do several things in education. One is that we are trying to do a better job of keeping our members abreast of, and giving our members an opportunity to keep up with, the application of the latest technological advances," he said, citing a "fairly intensive" desktop publishing seminar offered in conjunction with the recent conference.

He said one key educational effort is the promotion of certification, in particular the certified systems professional program that ASM originated in 1984 and passed along to the Institute for Certification of Computer Professionals.

"One of the things we are working on is having all educational programs be useful, applicable and taught in a hands-on environment," Adamson said. To meet that goal, ASM is negotiating with an outside organization for a series of ASM courses to be offered in laboratory-type settings. In such courses, attendees can work with the equipment, software and techniques rather than just hearing lectures.

Adamson said ASM now offers 150 educational programs through its international headquarters, and the headquarters staff is trying to work more closely with local chapters on organization, education and membership programs, he noted. He cited as recent accomplishments the addition of professional staff workers, more direct contact with the membership through features such as a monthly newsletter and the installation of a computerized association management system.

Asked about the possibilities of joint efforts or mergers with other associations, Adamson said ASM has had exploratory discussions with other groups about joint programs but that there have been no merger talks.


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**NRMA Seminar On POS and In-Store Systems.** Dallas, May 11-13 — Contact: National Retail Merchants Association, 100 W. 31st St., New York, N.Y. 10001.

**Brandon Managing Information Programs Forum, "Managing Information Services Today."** New York, May 12 — Contact: Carl Sgro, Brandon Managing Information Programs, 1775 Broadway, New York, N.Y. 10019.

**Electronic Networking Association Conference: Beyond Electronic Mail.** Philadelphia, May 12-15 — Contact: Nan Hanahue, c/o Electronic Technologies, Inc., ENA Conference, 2744 Washington St., Allentown, Pa. 18104.

## MAY 15-21

**Conference on Network Publishing.** Bedford, Mass., May 15-17 — Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

**Annual Meeting and Conference of the Software Maintenance Association.** Chicago, May 15-18 — Contact: Suzanne Grenoble, SMA 1988 Chicago, Box 391432, Mountain View, Calif. 94039.

**ICS 88 Third International Conference on Supercomputing.** Boston, May 15-20 — Contact: Program Committee: Suite B-309, 3000 34th St. S., St. Petersburg, Fla. 33711

**National FUSE Meeting.** Orlando, Fla., May 15-20 — Contact: Fuse, Inc., Suite 4302, 450 7th Ave., New York, N.Y. 10123.

**Inteco Computer Industry Conference.** Burlington, Mass., May 16 — Contact: Inteco, P.O. Box 1054, 102 Halls Road, Old Lyme, Conn. 06371.

**Frost & Sullivan Conference, Computers & Communications in the Healthcare Industry Strategic Implications.** Chicago, May 16-17 — Contact: Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

**Information Technology and Securities Markets Under Stress.** New York, May 16-17 — Contact: Center for Research on Information Systems, Graduate School of Business Administration, New York University, 90 Trinity Place, New York, N.Y. 10006.

**Hammer Forum 88: Electronic Marketing.** White Plains, N. Y., May 16-18 — Contact: Hammer and Co., 5 Cambridge Center, Cambridge, Mass. 02142.

**Optical Storage 88, International Optical Storage Forum.** Denver, May 16-18 — Contact: Cartlidge & Associates, Inc., Suite 202, 3097 Moorpark Ave., San Jose, Calif. 95128.

**International Communications Association Conference and Exposition.** Anaheim, Calif. May 16-19. Contact: ICA, Suite 710, 12750 Merit Drive, LB-89, Dallas, Texas, 75251.

**Annual Office Systems and Networks Dialogue.** Boston, May 17-19 — Contact: May Giacalone, Wohl Associates, 555 E. City Line Ave., Bala Cynwyd, Pa. 19004.

**Dexpa Spring 88.** Cincinnati, May 17-19 — Contact: Expoconsul International, Inc., 3 Independence Way, Princeton, N.J. 08540.

**Engineering Workstations Conference.** Boston. May 17-19 — Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

**Annual Conference Association of Rehabilitation Programs in Data Processing.** Dallas, May 17-20 — Contact: Jim Vagnoni, Chairperson, c/o Center for Information, 3rd floor, 4025 Chestnut St., Philadelphia, Pa. 19104.

**Digital Dealers Association Spring Meeting.** Cincinnati. May 18 — Contact: DDA Headquarters, Suite 202, 107 S. Main St., Chelsea, Mich. 48118.

**Hard Copy Supplies Conference.** Boston, May 18-20 — Contact: Cap International, Inc., One Snow Road, Marshfield, Mass. 02050.

**1988 Information Management Conference.** Toronto, May 18-20 — Contact: John Hobbs, Suite 311, 55 McCaul St., Toronto. M5T 2W7.

**CD-ROMs In Office Automation and Business Seminar.** Arlington, Va., May 19 — Contact: Office Automation Society International, P.O. Box 374, 6348 Munhall Court, McLean, Va. 22101.

**Capitalizing On Technology Transfer.** Cambridge, Mass., May 19-20 — Contact: Susan Morgan, 627 National Press Building, Washington, D.C. 20045.

**Information Services:** The Regional Bell Operating Company Era. Washington, D.C., May 19-20 — Contact: Telestrategies, 1355 Beverly Road, McLean, Va. 22101.

**Prism User Conference.** Boston, May 19-20 — Contact: Marcam Corp., 19 Crawford St., Needham, Mass. 02194.

## MAY 22-28

**ABA 1988 National Operations and Automation Conference.** Atlanta, Ga., May 22-25 — Contact: American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

**Electronic Shopping '88.** Boston, May 22-25 — Contact: Touche Ross & Company, Suite 1900, Alcoa Building, One Maritime Plaza, San Francisco, Calif. 94111.

**VIP '88. Duquesne Systems' International User Group Conference.** New Orleans, May 22-25 — Contact: Mark Power, Duquesne Systems, Two Allegheny Center, Pittsburgh, Pa. 15212.

**Expert Systems and Artificial Intelligence Symposium.** Washington, D.C., May 23-25 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810.

**Case Studies Ninth Annual Conference on Applications of Computer-Aided Software Engineering Tools.** Ann Arbor, Mich. May 23-27 — Contact: Rebecca Sizemore, Meta Systems, Suite 200, 315 E. Eisenhower, Ann Arbor, Mich. 48108.

**Contrasting Perspectives on Information Technology.** Wellesley, Mass., May 24 — Contact: Center for Information Management Studies, Babson Park, Wellesley, Mass. 02157.

**Ordernet Services' User Group Meeting.** Columbus, Ohio., May 24-25 — Contact: Sterling Software, Ordernet Services Division, 1651 N.W. Professional Plaza, Columbus, Ohio. 43220.

**Testing for Conformance to Information Technology Standards.** Gaithersburg, Md., May 24-25 — Contact: U.S. Department of Commerce, National Bureau of Standards (600), Gaithersburg, Md. 20899.

**Aerospace and Defense Project/2 Group Conference.** Newport Beach, Calif., May 24-26 — Contact: Rob Bloom, Project Software & Development, Inc., 20 University Road, Cambridge, Mass. 02138.

**Mark Up '88, International Conference and Showcase on The Standard Generalized Markup Language. Ottawa** May 24-26 — Contact: Graphic Communications Association, Suite 604, 1730 N. Lynn St., Arlington, Va. 22209.

**Computer Marketing Symposium.** New York, May 25 — Contact: ACS Communications, Suite 306, 55 Northern Boulevard, Great Neck, N.Y. 11021.

**Document Management Systems Conference.** Washington, D.C., May 25-27 — Contact: International Information Management Congress (IMC), 345 Woodcliff Drive, Fairport, N.Y. 14450.

**Document Management Systems Conference.** Stockholm, May 25-27 — Contact IMC, 345 Woodcliff Drive, Fairport, N.Y. 14450.

**SERVCON.** Boston, May 25-27 — Contact: United Publications, Inc., P.O. Box 655, Yarmouth, Maine 04098.

**California Computer & Graphics Show.** Palo Alto, Calif., May 26 — Contact: Dana DeNardi, Suite 204, 289 S. San Antonio Road, Los Altos, Calif. 94022.

**Electronic Data Interchange: Bringing It Together in Government.** Gaithersburg, Md., May 26 — Contact: Dorothy Wuhrman, National Bureau of Standards, Room B166, Building 225, Gaithersburg, Md. 20899.


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# Gilliam

FROM PAGE 87

It seems that the computing field is filled with individuals who are proud of their independence and are suffering from a superiority complex. However, in a business in which no one person is indispensable and teamwork is a necessity, strong egos can be a real roadblock to progress.

But why, then, do managers seem so reluctant to ask for the opinions of their own employees? What about the knowledge and insight available from users, vendors, consultants and even auditors?

No one wants to be criticized or have their mistakes and weaknesses revealed. But the manager who puts pride aside and asks for constructive suggestions can open the door to great accomplishments by the MIS department and improve the relations with executives and users alike.

### Cast a critical eye

To formalize such communications, the systems manager might initiate an annual MIS appraisal. With such a step, the manager invites others to critique the information systems unit. These people can note the unit's strengths and offer suggestions on how the organization can improve its products and services.

The manager should realize that no person or organization can do everything perfectly. There are always areas that need improvement. The real issue is where to place the priority or emphasis. The appraisal will result in a prioritized list of steps that should be included in the work plans and budget for the following year.

The appraisal could be accomplished in a variety of ways. Of course, a survey form could ask specific questions or request a rating of the various services and products. Discussion groups or quality circles could promote an interactive brainstorming process leading to a prioritized list of suggestions. Another approach is to ask for a written response that points out where performance is good, describes problems and proposes solutions.

From whom should the manager seek such constructive criticism?

Start with the customer, which in this case is the user. Since the primary reason for the existence of the systems function is to serve the user, this is the group whose opinions matter most.

But just to allow the users to air their complaints is not worthwhile. Responses must be specific and offer solutions. An acknowledgment to users of the receipt of their information will confirm the importance of their participation.

Even a session to review each item for clarification will go far in improving communication with the user. But the MIS manager and the staff definitely must not go into any such discussion ready to do battle, debating the complaints in a defensive fashion.

> SINCE THE PRIMARY reason for the existence of the systems function is to serve the user, this is the group whose opinions matter most.

### Drop your guard

For the time being, both parties should not try to defend or explain why a situation exists. The response to the user comes later — in a written explanation along with the proposed steps to be taken in solving the problem.

Another major source for the appraisal is the employee. Many managers are reluctant to ask their own people how things can be done in a more effective manner. Yet these are the people who are most likely to point out weaknesses and offer practical solutions.

In addition, if the employees feel their opinions are respected, they tend to put forth extra effort to ensure success for the organization.

Other participants in the appraisal could include the vendor representatives, consultants and auditors.

What should be done with the information gathered from the appraisal process? First, the systems staff should categorize the responses into groups for review. Next, the problems and suggestions should be ranked by priority, according to the number of times listed and according to value to the user and the company.

Then each major problem should be labeled "urgent," "important" or "reconsider later." The urgent items should be addressed right away. The important ones should be a part of the next year's work plans. The reconsider later items should be held in abeyance until the following year.

### Plan your strategy

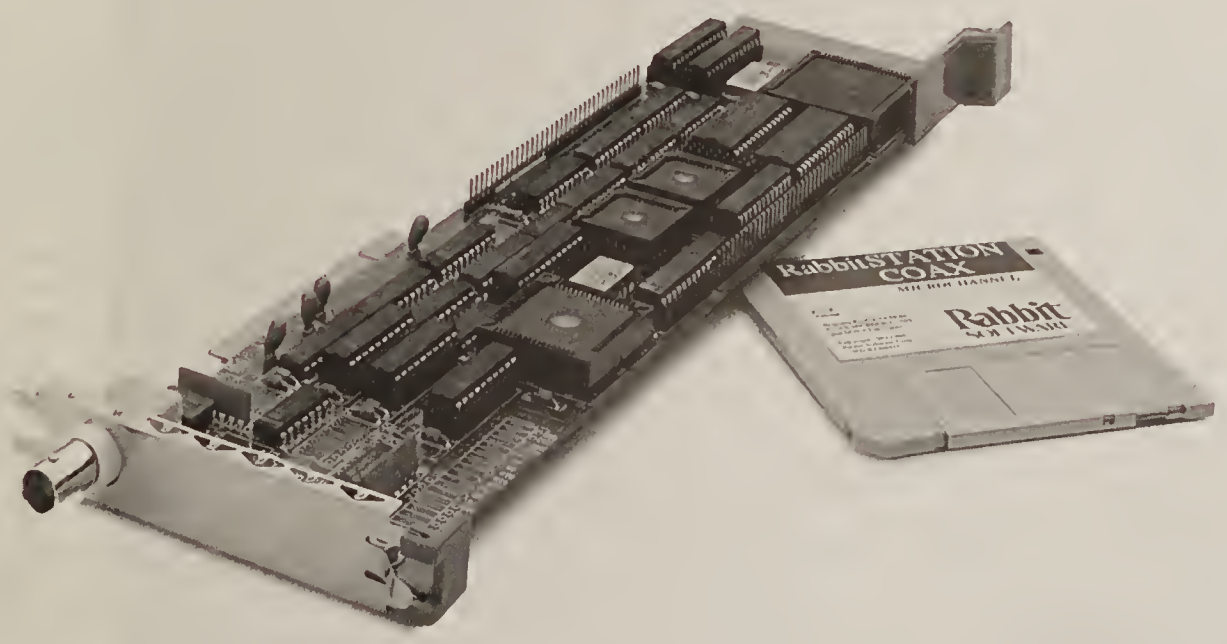
The next step is to develop a general approach and a time frame to pursue a solution for the urgent and important problems.

Finally, a summary of the annual appraisal should be submitted to executive management, with emphasis on the planned steps for solving problems. It would be appropriate to include a summary of the strengths of the organization as observed by the respondents. Copies would be passed out to the respondent groups.

By allowing MIS to be critiqued, the manager is able to pinpoint specific weaknesses, develop solutions and move forward in upgrading the professional image and performance of the systems group.

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# Garber

CONTINUED FROM PAGE 87

as the classic take-charge executive who comes into a new operation with his game plan mapped out and ready to go. In fact, his management style seems characterized by a strong willingness to hear out the other side before he goes ahead.

### Instilling change

One of his favorite words is "instill," which *Webster's Ninth New Collegiate Dictionary* defines as "to impart gradually." Garber does not blindly assume that his way is best but checks out why things are done a certain way before changing them.

He learned this lesson the hard way at Wells Fargo Bank NA, at which he directed the telecommunications aspects of that company's acquisition of Crocker Bank. From a technical angle, Garber's job consisted mainly of linking Crocker's facilities with the Wells Fargo network and then analyzing user demographics in order to consolidate network resources and take advantage of economies of scale.

Garber learned that even two technically compatible networks can be difficult to mesh because "configuration and design can be so drastically different." He brought that knowledge to Fidelity. "The technology here is also similar to what I have worked with," Garber explains, "but I had the sense to step back and say, 'Educate me; tell me how you designed and installed this and how you use it.' "

But the biggest job at Wells Fargo was "integrating the cultures of the two groups," Garber recalls. "Just saying, 'You'll all work together' didn't work."

The Crocker people had to accept the fact that they had to become Wells Fargo people. "We were not willing to change the way we did things, so they had to change," Garber explains.

But there were problems. "The way they approached design, for example, was 180 degrees different from us," Garber notes. "They said, 'We just don't do it that way.' There were battles — personalities."

Garber says his trial by fire at Wells Fargo stood him in good stead when he took over telecommunications at Fidelity. "I think I was brought in because I have spent a lot of time in the financial industry managing network costs and resources, making value judgments on what to buy and fitting the network plan with the organization's financial and strategic goals." When he arrived, Garber took a hard look at Fidelity's corporate culture as well as its top priorities — "what areas the company has no problem spending money on."

A major priority, he found, is customer service. Garber saw Fidelity spending more money than he was accustomed to on excess networking capacity and redundancy. "At first I thought this was waste," Garber says. But he changed his mind after realizing that the extra outlay helped ensure high levels of availability and response time for Fidelity's customer services. In this area, at least, he has decided not to make changes.

### Costly technical gurus?

Initially, Garber found that many users saw his group as "technical gurus spending all the profits" without providing high-quality, reliable service. Garber has been trying to make telecommunications people at Fidelity more responsive to the needs of the users they serve in Fidelity's 19 companies — including software and systems people whose services are delivered over the telecommunications network. "I'm trying to instill the idea that we are not necessarily users' sole source; that they are allowed to get the same service elsewhere if it's cheaper and more reliable."

Garber says he feels the department has become more user-oriented since he came on board, but still has a way to go before he is satisfied. He now spends half of his time meeting with users, obtaining feedback about their needs. "I think it's one of the key things I was brought here to do."

"Greater responsiveness to user needs is something we started focusing on two years back; [Garber] has taken it to the next plateau," says Michael Simmons, president of Fidelity Information Services Co.

Simmons says he hired Garber "because of his reputation and because I liked his management style. He's continually looking for other, better ways to do things and testing to make sure the parameters we're using are the right ones." Simmons says Fidelity needs someone who is "continually changing the way we do business, to ensure we're not getting fat, dumb and happy."

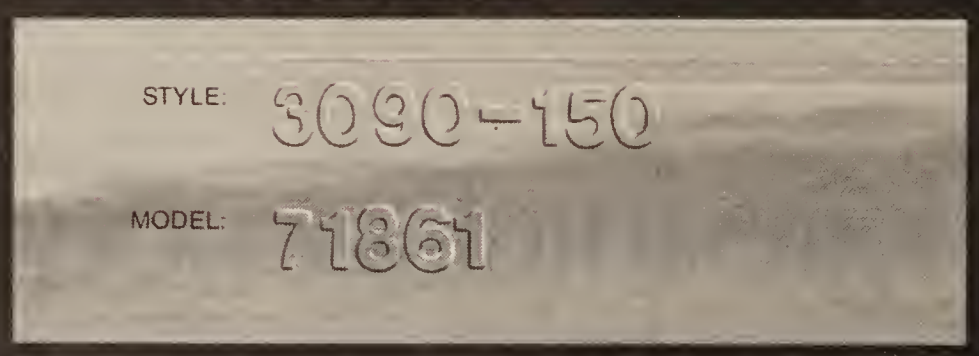
Garber was brought into a newly created position "as a necessary piece" of Fidelity's reorganized voice and data communications division, Simmons said. The group began as an 18-person office in 1983 and now contains more than 100 people.

"He came in and took a growing operating division, realigned responsibilities and put people in different jobs. He's generally up, with a bounce in his step. I see him as a positive influence," Simmons says.

Garber's hobbies are "snow skiing and snow skiing," which offers both the personal challenge of conquering the mountain and the interaction of a family activity. "There aren't too many sports left where each member can exert to their own capacity," he laments. Garber has three children, including a daughter in college "who is in preveterinary medicine, not DP."


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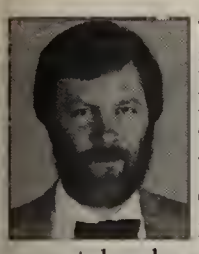


ENCORE The Original Cast

INDUSTRY INSIGHT

*William Zachmann*

## Demise of proprietaries



The accelerating flight from proprietary architecture by traditional vendors is one of the most significant recent developments in the computer industry. It is an early indication of the eventual demise of proprietary architectures and the rise of standards.

For the past 40 years, proprietary architectures from individual system vendors have dominated computer use. In choosing a computer vendor's product, users have implicitly chosen to commit to a unique, proprietary architecture specific to that vendor.

This has meant that users, once the initial choice of vendor was made, normally continued to buy from that vendor as upgrades and replacements for the original system were needed. The investment in training and software specific to the system architecture, operating system and network architecture of the original vendor prevented users from easily changing from one vendor to another.

Normally, unless there was something seriously wrong with the vendor or the vendor's products, users stayed with the one they already had. The direct and indirect costs of converting from one proprietary

*Continued on page 100*

# CBEMA backs trade bill veto

*Plant-closing measure reverses industry group's support*

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The competitive pressures of the computer industry and giving employees advance notice of plant closings do not mix, according to the hardware vendors' leading trade association.

As a result, the Computer and Business Equipment Manufacturers Association (CBEMA) is supporting President Ronald Reagan's expected veto of the omnibus trade bill. Although the bill contains reduced export controls and other provisions supported by the computer industry, CBEMA will lobby Congress to sustain the veto because of the plant-closing provision.

The provision would require large employers to give workers 60 days' notice before closing a plant or laying off more than 33% of the work force. CBEMA and other business groups argue that advance notice would reduce the flexibility of firms trying to become more competitive, hasten the demise of companies trying to negotiate with creditors and suppliers and permit sabotage by departing workers.

There is a slim chance that congressional leaders will try to resurrect the bill by stripping away the controversial provision. "That would be our ideal scenario," said CBEMA spokeswoman Charlotte LeGates.

The American Electronics Association also believes the plant closing measure justifies supporting a veto of the bill, but representatives of the software industry disagree.

ADAPSO, the computer software and services industry association, opposes the provision but nevertheless supports the trade bill, especially the provisions to combat foreign piracy of software, according to Alice Denson, ADAPSO's manager of

*Continued on page 99*

# IBM Credit saddled by profit drop

BY CLINTON WILDER
CW STAFF

OLD GREENWICH, Conn. — The effect of tax reform, a continued decline in profit margins and several ill-fated forays into noncomputer leasing in 1987 combined to saddle IBM Credit Corp. with its first yearly profit decline since its 1987 formation.

IBM's leasing unit profits fell 27% from $118.1 million in 1986 to $85.8 million last year, according to the unit's recent Securities and Exchange Commission filing. But $18.5 million of the decline was attributable to a one-time charge for a loss incurred in an offshore drilling rig lease deal.

Even without the extra charge, however, the Tax Reform Act of 1986 took its toll on IBM Credit. The elimination of the investment tax credit removed incentive for independent investors to fund leasing companies' purchases of computers, and IBM Credit's results dramatically reflected that elimination.

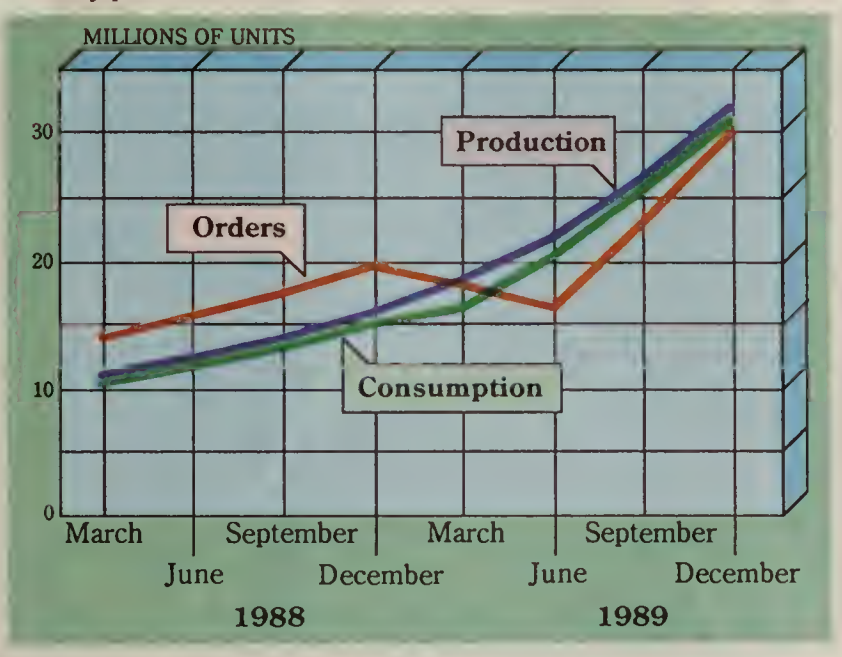
In 1986, investor partner-

*Continued on page 97*

# Dynamic RAM void hurts industry

**Dynamic RAM chip shortage continues**

*Supply and demand estimates show 1M-bit dynamic random-access memory production will not match order rates until March 1989*




INFORMATION PROVIDED BY S. G. WARBURG & CO.
CW CHART

BY J. A. SAVAGE
CW STAFF

ALAMEDA, Calif. — Putting its faith in the technology it espouses, Dataquest, Inc. predicted strong computer industry growth but warned of potential problems from the dynamic random-access memory chip shortage at a press teleconference late last month.

"Big firms will [have enough chips] because they have contracts with suppliers which will let them ship products," said Manny Fernandez, president of Dataquest, a San Jose, Calif., research firm. "But [the dynamic RAM supply] will be a significant problem for small guys."

Fernandez added that systems may even be shipped with no memory with promises of

*Continued on page 97*

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- Symbolics becomes OEM channel for Sony. Page 96.
- Siemens consolidates business operations. Page 99.
- Parent gets preliminary offer for Execucom Systems. Page 101.


CONFERENCE NOTEBOOK

# Compaq, Apple forecasts elevate conference

BY KATHY CHIN LEONG
CW STAFF

SAN FRANCISCO — With investment spending in the computer industry up this year, the outlook for 1989 will be strong, said William Welty, director of research at Hambrecht & Quist, Inc. With that note of assurance, Welty kicked off the 16th Annual Hambrecht & Quist Technology Conference here.

More than 170 public and private technology companies peddled their wares during the three-day affair. Company highlights included the following:

**Compaq Computer Corp.** Chairman and Chief Executive Rod Canion announced that international sales constituted 30% to 33% of last year's revenue. Overall, product demand peaked late last year. The Deskpro 286 remains the highest volume product in Compaq's line, although Canion said he believes the market is moving toward the Deskpro 386.

**Apple Computer, Inc.** While Compaq figures proved strong, so did Apple's outlook. Del Yocam, Apple's chief operating officer, commented that sales of the Macintosh II proved to be "one of the most pleasing things" about Apple's recently ended second quarter.

While the Macintosh has a strong foothold in many market segments, Apple also cut the price of its Macintosh Plus. According to Yocam, "It wasn't done to shore up a dying product line, but to gain ground in new markets like the home office and small business and to create a strategic anchor at the low end of the Mac line."

**Ashton-Tate Corp.** For the rest of this year, Ashton-Tate, which raked in $267 million in the past fiscal year, will concentrate on developing products that support IBM's PC-DOS and OS/2, Apple's Mac Finder, Unix



**Compaq's Canion**

and Digital Equipment Corp.'s VMS.

With an emphasis on a new Macintosh software division to be created in Sunnyvale, Calif., the company will be placing much of its research and development effort into Macintosh products, including Full Impact, its spreadsheet for the Mac, which is slated to be released in June instead of July.

**Tandem Computers, Inc.** The vendor that offers fault-tolerant on-line transaction processing systems expects continued growth this year after hitting the $1 billion revenue mark in 1987, said David Rynne, vice-president and chief financial officer.

Rynne said Tandem's agreement with AT&T and Plano, Texas-based Integrated Technology, Inc. is driving development into the Integrated Services Digital Network market.

*West Coast correspondents Julie Pitta and J. A. Savage contributed to this report.*

## INDUSTRY WEEK IN BRIEF

**AT&T** announced its first round of investment in **Sun Microsystems, Inc.**, a $40.6 million stock purchase that will give AT&T a 2.45% stake in the Mountain View, Calif., workstation maker. Under the landmark agreement announced in January, AT&T can purchase up to 15% of Sun.

The board of directors of **Apple Computer, Inc.** elected **Cray Research, Inc.** Chairman John Rollwagen to the Apple board. Rollwagen is the first executive from another computer vendor to join the board. Apple is a Cray customer.

A deal to acquire **TIE/Communications, Inc.**, a Shelton, Conn.-based private branch exchange vendor, was canceled last week. Would-be acquirer **ABI American Businessphones, Inc.** in Irvine, Calif., said its investment banker, Bateman Eichler, Hill Richards, Inc., withdrew its fairness opinion to ABI shareholders. The two companies had reached an agreement in principle in December 1987. ABI is a seller of telephone systems to small and medium-size businesses.

**Network Equipment Technologies, Inc.** registered robust quarterly and yearly earnings growth. Yearly revenue increased to $90.6 million, a 91% increase over the $47.4 million reported for the 1987 fiscal year. Net income for the year was $15 million, or $1.09 a share, compared with $5.1 million, or 41 cents a share, logged a year earlier. Fourth-quarter revenue for the Redwood City, Calif., communications products company was up to $27.9 million, a 78% increase over the same quarter a year earlier. Net income was $3.8 million, or 28 cents a share.

**Interleaf, Inc.** passed the $50 million revenue mark for its fiscal year ended March 31. The Cambridge, Mass., vendor of computer-aided publishing systems said sales grew 57% to $58.4 million. Net income rebounded from a $410,000 loss in the previous year to a profit of $7 million, or 59 cents per share. The fourth quarter was particularly strong as earnings reached $2.5 million, compared with just $642,000 last year. Quarterly revenue increased 54% from year-earlier results to $18.1 million.

**Econocom-USA, Inc.** President Michael L. Nelson will take over the chief executive officer's post of the Memphis-based lessor and distributor from Chairman Kenneth Bouldin. Effective June 1, Bouldin will become president of the Computer Dealers and Lessors Association. Nelson, an Econocom cofounder, also spent three years at Skokie, Ill.-based lessor Forsythe McArthur Associates, Inc.

# Symbolics to resell Sony gear

BY STANLEY GIBSON
CW STAFF

CAMBRIDGE, Mass. — Troubled artificial intelligence systems maker Symbolics, Inc. last week announced a new tactic to bolster its business. It will become an OEM channel for Sony Microsystems Co. Unix-based technical workstations.

Under the terms of what both companies called a strategic partnership, Sony and Symbolics will share new product plans, technical and sales training and cooperative marketing programs for Sony's News family of workstations.

In addition, Symbolics will offer systems based on Sony workstations integrated with Symbolics hardware, software and peripherals. The systems, in which a Symbolics LISP-based Ivory processor will be embedded, will be sold and serviced by Symbolics.

### Deal worth $60M

The agreement is valued at $60 million over a three-year period. The U.S.-manufactured News workstations were introduced in the U.S. in February and began shipping recently. "This will enable us to move beyond our software engineering and electronic publishing markets and extend into symbolic processing as well," Sony Microsystems President Masahiro Morimoto said in a prepared statement.

Symbolics customers can use News workstations as software development tools, as general-purpose workstations to run Unix applications and as network nodes to knowledge servers for symbolic processing applications, according to Symbolics. Symbolics will also provide a version of its Common Lisp Operating Environment software for use with Sony News workstations.

Palo Alto, Calif.-based Sony Microsystems is a wholly owned subsidiary of Sony Corp. of America, a subsidiary of Tokyo-based electronics giant Sony Corp.

Separately, Symbolics announced that it is dividing its operations into a systems division and a software division.




# Dynamic RAM

CONTINUED FROM PAGE 95

later delivery.

The highest growth market sector, Fernandez predicted, will be in the computer storage market. He expects storage to double in market size, to $38 billion by 1992.

### Winner by a mile

In the computer market itself, Fernandez claimed that technical computers will be the "clear winner," while business computer sales will be stable.

Technical computers will almost double in sales, from $9.4 billion in 1987 to $17.2 billion in 1992, Fernandez estimated. He also predicted that IBM will begin to introduce products aimed at Digital Equipment Corp.'s core of technical wares.

The IBM vs. DEC battle continues "and is starting to heat up" in the business computer market, Fernandez said. He predicted only moderate growth in this sector, from $20.5 billion last year to $27 billion in 1992.

Fernandez said his crystal ball got a little cloudy when he tried to predict the personal computing market. On paper, he expects the market to grow from $20.4 billion last year to $29 billion in 1992. "However, the availability of dynamic RAMs can play havoc with this whole forecast," he cautioned.

Four issues that Fernandez called "megatrends" affect all sectors of the computer industry: standards, alliances, intellectual properties and competitiveness.

According to Fernandez, companies have been forced to cooperate on standards across the board. "Users went out to the polls and voted. They said, 'No standards, no product,' " he said.

Alliances include traditional mergers, consortiums to pool capital for common research and development and "virtual vertical integration" — a term Dataquest uses to mean alliances between users and vendors for mutual advantage.

Alliances are important in today's market, Fernandez explained, "because people cannot do it all alone anymore."

The issue of intellectual property will affect future products, he said. While the protection of intellectual property is suddenly a hot item, according to Fernandez, it should have been expected.

"Why spend time on this? The development costs are so high that industry must protect itself and charge for it," he said. Fernandez claimed that it now costs about $80 million to develop a new microprocessor, whereas it cost only $2 million a few years back. "At the same time, product life cycles are shrinking," he commented.

Finally, competitiveness will drive automation, according to Fernandez. He said automation can enhance not only productivity but the quality and consistency of U.S.-made products.

The Dataquest teleconference was beamed via satellite uplink from the town of Alameda to sites in Boston and New York. The event marked Dataquest's first attempt at employing teleconferencing, but the Boston and New York sites had trouble with the audio. In Boston, only one microphone worked properly, and journalists had to play musical chairs in order to ask questions.

# IBM Credit

CONTINUED FROM PAGE 95

ships contributed $887 million to IBM Credit's business volumes, but in 1987 the amount plunged to $182.9 million. That decline contributed to an overall 16% drop in the firm's business volumes in 1987.

Although IBM Credit is the largest computer leasing firm, it is only a tiny part of IBM's more than $50 billion annual business. "I don't think IBM executives are losing any sleep over IBM Credit's results," said Bob Djurdjevic, president of Annex Research in Phoenix.

"IBM Credit is still fulfilling its strategic role — providing an alternative way of [customer] renting while IBM itself gets out of the renting business," Djurdjevic added.

Djurdjevic also noted a 23% increase in IBM Credit's expenses in 1987. That drove IBM Credit's net profit margin down for the fifth consecutive year to 11.8%. Its net margin in 1983, by contrast, was 21.5%.


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Note: The third annual Computer Press Awards competition was held April 12, 1988, in New York. Co-sponsors of the competition are Citizen America Corp. and Computer Press Association.

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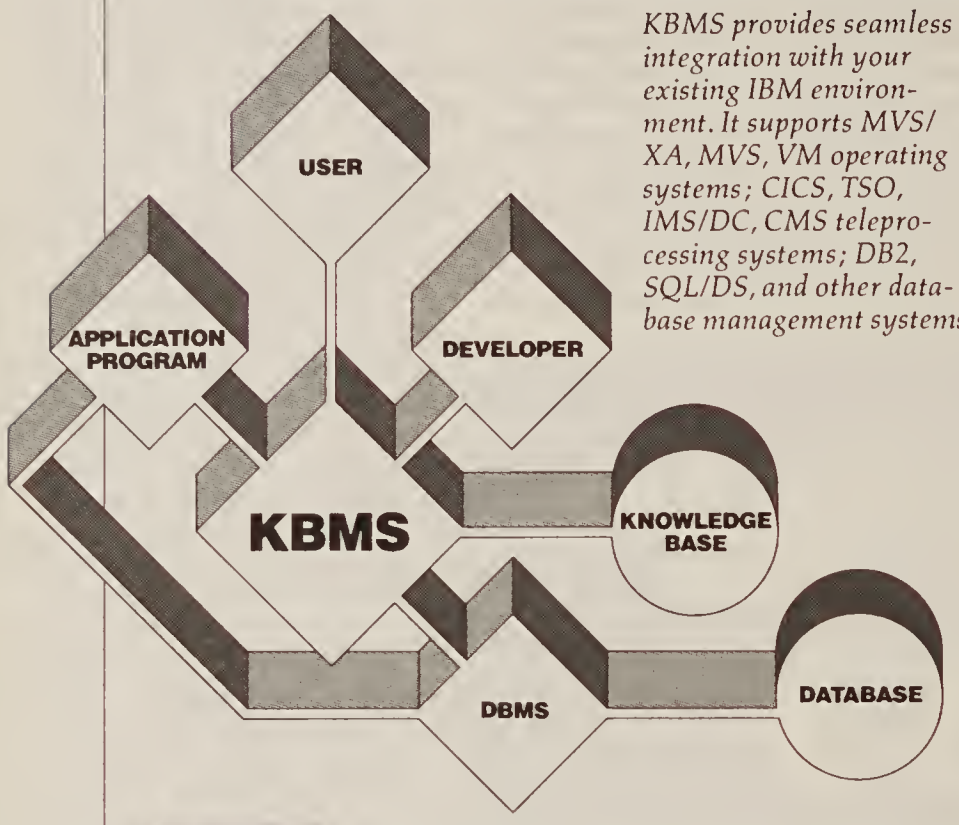
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# CBEMA

CONTINUED FROM PAGE 95

international affairs.

"In an ideal world we would love to have the plant closing provision removed," Denson said. ADAPSO spokesman Chris Carleton noted that the association believes passage of the trade bill could prevent more protectionist measures in the future. The software and services industry generally opposes protectionism because of potential retaliation by foreign markets, he said.

After three years of legislative work, the 983-page trade bill was approved by the House of Representatives and the Senate last month, but the Senate tally was three votes shy of the two-thirds majority needed to override a veto. Reagan is expected to veto the bill sometime this week.

"For all those who think we will automatically have a new bill [after the veto], that is not the way it is," warned Sen. Lloyd Bentsen (D-Texas), who led the Senate's conference committee on the trade bill.

But Stephen D. Cohen, trade analyst for Washington Analysis Corp., suggested there may be a last-minute compromise to revive the bill, although it may take several weeks to work out. "The trade bill is wounded, but not dead, since all domestic interests have more to lose than to gain by its demise," he said.

**Provisions supported**

While the plant closing provision has attracted the most attention in the last few weeks, the omnibus trade bill has a variety of provisions that the computer industry supports:

- A reduction in export controls on technology sold to Europe and Japan. Overall, the bill cuts by roughly 40% the number of export licenses required, so that more attention would be focused on protecting the most sensitive technology from diversion to the Soviet Union, according to Sen. William Proxmire (D-Wis.).
- A section requiring the president to negotiate for greater U.S. access to telecommunications markets in Japan, Canada, France, West Germany and other countries. If the negotiations fail, then the president would be required to impose trade sanctions [CW, April 7, 1986].
- Implementation in 1989 of the harmonized tariff system, a standard classification system for imports and exports [CW, Dec. 21, 1987].
- Many provisions intended to strengthen the protection of intellectual property rights such as software copyrights.

One controversial part of the trade bill would impose sanctions against Toshiba Corp. to punish the Japanese conglomerate for a subsidiary's sale of high-technology gear to the Soviet Union [CW, July 6, 1987]. The sanctions include a three-year ban on federal government contracts with Toshiba Corp. and a three-year ban on all imports from Toshiba Machine Co., the guilty subsidiary.

If the trade bill dies, Sen. Jake Garn (R-Utah) has vowed to push for stronger import bans against all Toshiba subsidiaries, including the U.S. unit that sells a popular line of laptop computers.

The bill also has a variety of little-known provisions that may affect the computer industry, including the creation of a 12-member advisory group called the Competitiveness Policy Council.

# Siemens integrates tech groups

BY CLAUDIA MARWEDE-DENGG
IDG NEWS SERVICE

MUNICH, West Germany — Siemens AG, the giant West German electronics and telecommunications supplier, is undergoing a major reorganization of its information technology activities.

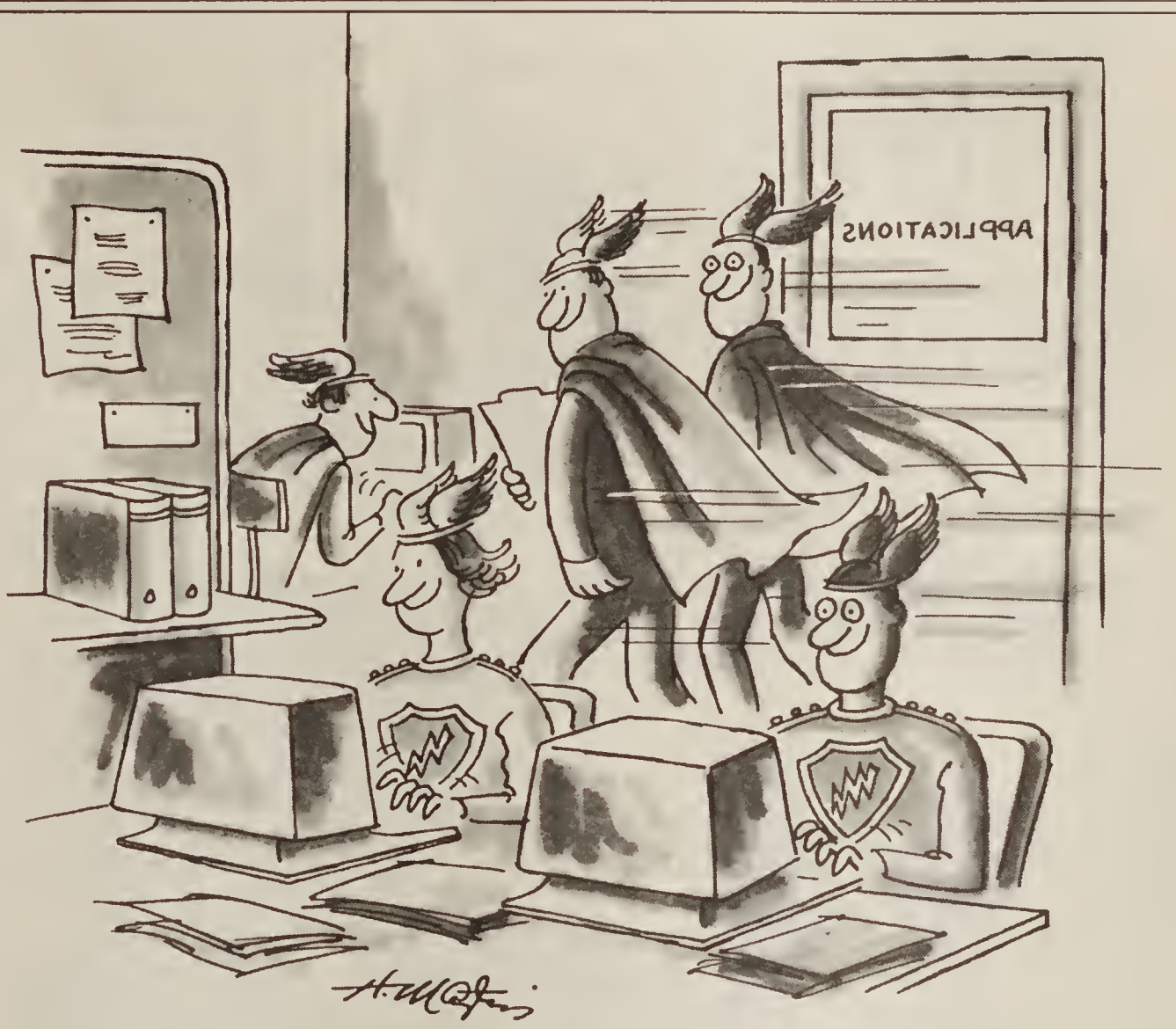
Confronted with the progressive merger of data processing and communications technologies, the industrial group last month started transforming four divisions into two. A Siemens spokesman said the reorganization is "nothing spectacular, but it is a step towards more integration."

Units for data systems and for private communications systems and networks are to be combined into a single systems division. Divisions responsible for communications terminals and peripherals will be merged into an equipment division.

The systems division will be responsible for joint systems planning and marketing for all products, including software. The division has three production plants: two in Augsburg, West Germany, for mainframes and departmental computers, and one in Witten, West Germany, for private branch exchanges and software development. Marketing will continue to be largely industry oriented.

In contrast, the new equipment division will remain product oriented. It will focus on distributing communications terminals and peripheral systems. The division will manufacture telex and teletex terminals in Berlin, West Germany, telephone terminals in Bocholt and Gladbeck, West Germany, and laser printers and disk storage systems at a Munich-based plant.

Information technologies account for more than one-third of the diversified industrial group's revenue. According to a Siemens spokesman, telecommunications networks and security systems represented 18%, or about $6.1 billion, of total sales of $30.7 billion last year. Communications and information systems were 19%, or about $6.14 billion.


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# Zachmann

CONTINUED FROM PAGE 95

architecture to another were just too high.

In both the original mainframe environment of the 1950s and 1960s and the emerging world of minicomputer use in the 1970s, proprietary architectures unique to individual vendors dominated.

More recently, however, that has begun to change. In personal computers, the de facto standard that IBM unintentionally created with the IBM Personal Computer, PC XT and AT established, for the first time, widespread commercial use of what amounted to a nonproprietary system available from hundreds of different vendors.

IBM-compatible micros running Microsoft's MS-DOS have set a precedent that is starting to spread to larger and more capable systems. OS/2, developed by Microsoft and IBM, will provide an even more capable operating system environment for desktop systems and network servers based on Intel 80286 and 80386 microprocessors.

At the same time, Unix, the standard operating system developed and sponsored by AT&T, is maturing and offering a real alternative to proprietary architectures and operating systems for larger multiuser systems. Unix is now poised on the brink of much more rapid penetration of business markets.

Together, DOS, OS/2 and Unix offer partially competitive but largely complementary options to the proprietary environments that have traditionally dominated computer use. They are becoming the rallying points for a growing number of vendors as well.

The battle is shaping up as a three-way struggle. IBM's proprietary system environments, historically dominant in the industry and still dominant in large mainframe systems, are the first contenders.

DEC's VAX/VMS is the second. DEC's tremendous success over the past few years has made it the only other proprietary architecture, besides IBM's, with reasonable prospects for continued success. With few exceptions, all the other proprietary architectures and operating systems, ranging from traditional mainframe and minicomputer vendors, are no longer long-term contenders. Instead, it is Unix in larger multiuser systems and MS-DOS and OS/2 on the desktop that offer the real alternative for vendors as well as for users.

What's more, it is these newer, standardized architectures that constitute the most rapidly growing sector of the market for information systems.

### Viable alternatives

As a growing list of system vendors start to replace their traditional, proprietary architectures with systems running Unix or OS/2, these nonproprietary standard environments are rapidly approaching the critical mass required to initiate a chain reaction creating a viable alternative for users.

The greater competition these standards create is combining with less expensive yet increasingly powerful microprocessor-based systems to offer a far more cost-effective option for users. Even very large applications can now be built with the lower-priced hardware that uses these standards.

Newer microprocessor-based products running Unix or OS/2 from traditional vendors like Unisys, Honeywell-Bull, Prime and others are just the beginning. Even IBM and DEC are starting to take their own Unix-based product offerings more seriously.

Information systems professionals concerned about providing the best capabilities for their organizations at the lowest cost cannot afford to overlook these newer, nonproprietary alternatives to traditional systems. The march toward standards is under way. Those who fail to join it in the next few years will be left behind.

Zachmann is vice-president of research at International Data Corp.

# West Germany invests in CIM

BY WOLF-DIETRICH LORENZ
IDG NEWS SERVICE

BONN — Hoping to boost the use of computer-integrated manufacturing (CIM) technology by small and medium-size companies, the West German government plans to invest $300 million during the next five years in a recently launched CIM program.

In a recent announcement here, Research Minister Heinz Riesenhuber said the CIM program is aimed at spurring West German manufacturers to "make use of the best technologies as fast as possible." He said wider use of CIM techniques would strengthen West German companies against rivals from newly industrialized countries in the Far East, as well as in the U.S. and Japan.

A recent study by market researchers RKW, based in Eschborn, West Germany, found that only 10% to 17% of West German companies use computers for production applications, compared with 19% that use them for commercial ones. Complex computer-controlled manufacturing accounts for only 3% of the companies using CIM, and automated material flow systems represent less than 1%.




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# Preliminary deal reached on Execucom sale

BY ALAN ALPER
CW STAFF

AUSTIN, Texas — After a nine-month search, Travelers/Diebold Technology Co. has reached a preliminary agreement to sell its Execucom Systems Corp. subsidiary to MPSI Systems, Inc., a Tulsa, Okla., developer of retail planning software for the petroleum industry.

If the deal is consummated, it will be the third time in the last four years that the once high-flying developer of IBM mainframe decision-support software has been sold.

Under terms of the agreement, MPSI would pay a minimum of $9.5 million for 14-year-old Execucom, which last year had revenue of about $19 million. The final purchase price could go as high as $15 million, depending on Execucom's revenue performance and MPSI's consolidated profits during the next three years. The deal is expected to close late this month or in early June, both companies said.

**Bumpy ride**

Execucom's growth has stagnated during the last several years as company ownership has changed hands and financial planners at user companies have moved their decision-support applications from mainframes to a host of microcomputer-based packages, such as Lotus Development Corp.'s 1-2-3.

The company continues to hold roughly 40% of the mainframe decision-support market, although use of such products is on a steady decline, according to Focus Research Systems, Inc. in West Hartford, Conn.

Quentin Mantooth, MPSI's chief financial officer, said acquiring Execucom would enable his $28 million company to expand its product line and customer base. He said the fact that Execucom has been bought and sold so many times does not concern him. "We studied it carefully and found that the company's reputation has not been tarnished with customers," Mantooth maintained.

Mantooth noted that Execucom would operate as a separate company. Current management and 170 employees in 13 offices worldwide, would be retained, he added.

Travelers/Diebold Chief Executive Dick Beckendorf said the search for a buyer was complicated by a desire to find someone suitable to Execucom's management. "We spent an excessive amount of time doing due diligence," he claimed.

Industry analysts, however, said buyers were wary of Execucom for a number of reasons, including its tough market position and ownership changes.

"It's getting harder and harder to find people willing to purchase companies in the under-$20 million range," said Charles Varga, president of The Cerberus Group, a Frenchtown, N.J., firm that tracks acquisitions and mergers in the information processing business.

Execucom was both the first and the last chapter in the Travelers/Diebold joint venture. The company acquired Execucom in May 1986 from Continental Telecom, now Contel Corp., as its first move in creating a technology development company.

The joint venture between the insurance giant and the consulting firm was dissolved last year after differences of strategy and financial constraints developed, analysts have said.

# Thirsty circuit makers marooned

BY J. A. SAVAGE
CW STAFF

SAN FRANCISCO — It could be a dry and expensive year for semiconductor manufacturers in San Jose and Santa Clara, Calif.

California's current drought recently caused the city of San Francisco to threaten to cut off its contribution to the two cities' water supplies, and the manufacturing primarily affected would be integrated circuits.

Chip manufacturing requires not only vast quantities of water but that the water be highly purified. Manufacturers tend to prefer the clean water supplied by San Francisco's Hetch Hetchy dam in Yosemite National Park because it needs less purification than water from other sources.

The other supplies available in the area are largely from groundwater. That water contains more minerals; therefore, it costs more to clean and deionize in preparation for use in semiconductor production.

Santa Clara receives only 17% of its supply from San Francisco, but in one area heavily populated by computer companies, that supply accounts for 90%.

Santa Clara is home to such companies as Intel Corp., National Semiconductor Corp., the Monolithic Memories, Inc. operation of Advanced Micro Devices, Inc., Siliconix, Inc. and Rolm Corp.

Major semiconductor makers headquartered in San Jose include Hitachi America Ltd., Cypress Semiconductor Corp., Sierra Semiconductor Corp. and Silicon General, Inc.


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# Finessing the job interview

*Skills and expertise are crucial, but how you handle yourself can help, too*

BY ANTHONY REED
SPECIAL TO CW



The face-to-face job interview is where you can move to the top of an employer's list of candidates or get scratched from it altogether.

Unfortunately, it's very difficult to learn how to improve your interviewing technique. Interviewers rarely provide direct, constructive feedback, in part because doing so might result in legal action against them. However, several data processing managers identified the following considerations.

### Set a career goal

In today's tight job market, many overzealous applicants have become DP chameleons. As the name implies, the chameleon drastically changes his personality and/or career objectives to meet the needs of interviewers.

This changeability becomes apparent when the person interviews with several departments in the same company. One "chameleon" was so convincing that during a postinterview meeting, managers thought they had interviewed different people. The applicant failed to get the job because his career goals appeared to be inconsistent.

The popularity of low-cost word processors and letter-quality printers has led to the "chameleon resume." One manager reported that an applicant sent his company several versions of a resume with different job objectives. Although the company had several openings, the applicant didn't get an interview because her career objectives were unclear.

### Just be yourself

Some DP professionals have realized the importance of a professionally prepared resume and interview coaching. However, these techniques may backfire when they overshadow an applicant's own personality.

One manager described a "prerecorded" interview. The applicant rattled off prepared answers like a tape-recorded message.

The manager began to wonder whether the applicant pressed a "smile button" at a predetermined time to show he was human.

The applicant was so well rehearsed that the manager eventually asked for his "study questions and answers." The interviewer wanted someone who was human, spontaneous and self-confident. She believed that if this candidate had to rely on a script during the interview, he could have problems responding to users while under pressure.

Honesty is still the best policy during interviews. If you don't know the answer to a question, just say you don't know it.

> HONESTY IS STILL the best policy during interviews. If you don't know the answer to a question, just say you don't know it. Trying to bluff your way through a technical interview insults the interviewer's intelligence.

Trying to bluff your way through a technical interview insults the interviewer's intelligence — and makes him wonder about the reliability of your resume.

Make a mental note of the interviewer's unanswered questions and learn the answers before your next interview. You would be surprised at the number of companies that use the same technical questions during interviews.

### The benefit beggar

Dwelling on company benefits during the initial interview is another taboo. Inquiring about benefits prolongs the interview and makes the interviewer wonder if you're more interested in being sick and taking a vacation than in working.

Most interviewers only want to discuss benefits with the person to whom they'll extend an offer. If you're interested in the benefits, contact the company's personnel department.

Most interviewers ask you if you have any questions. If you don't ask questions about the company, business or technology, the interviewer may get the impression that you're more interested in just getting a job rather than a position with his company.

When you're able to tell him about some of the articles you've read about him company or industry or ask specific questions about the company's operations, it implies that you have developed a strong interest in the position.

Most large libraries carry information about publicly held companies listed on the major stock exchanges. You can learn about a company's subsidiaries, major acquisitions, financial position and even future plans.

You can also visit its personnel or public information office and get a copy of its annual report and other documents.

### Do your homework

Before interviewing with a major financial software company, I learned about its product line and also that it had had three presidents in two years, lost money in three of the past five years and released a software package without a beta test, which led to layoffs, reorganizations and financial losses.

It took only 15 minutes of work to acquire this information in the public library's business section.

I followed up by making a couple of telephone calls to some professional contacts to add to what I had learned.

During one of the silent periods of the interview, I was able to describe the problems in detail, ask how they were resolving them and recommend solutions.

It is almost impossible to identify all of the things that you should do in an interview because not all of the interviewers are looking for the same characteristics.

However, if you are comfortable with your skills, focus your intentions, show an interest in the work to be done and demonstrate a knowledge of the company and industry, you can greatly increase your chances of getting a job.

Reed is director of business systems at a Dallas-area educational institution.

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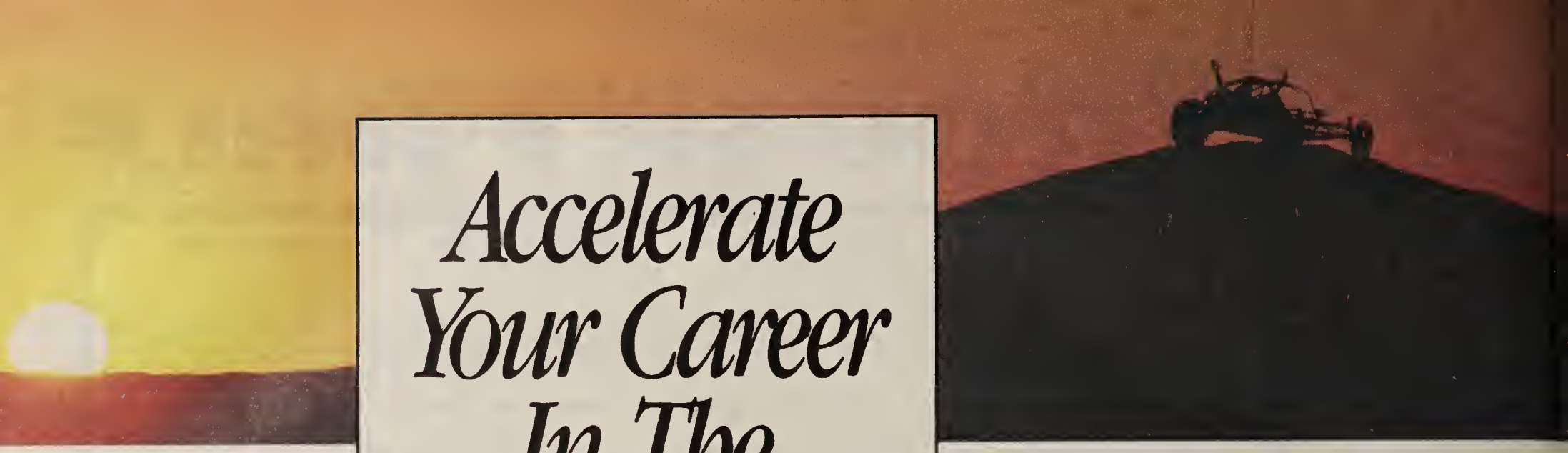
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***MVS Systems Programmer*** (391-09) New Denver-based company, undergoing major expansion to its data center, seeks a professional with three years of experience in MVS systems programming with IMS or DB2. Duties include performance tuning and capacity planning as well as sysgens. ***To $45,000 + bonus.***

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***MSA/McCormack and Dodge P/A and S/A*** (351-05) Suburban L.A. Fortune 500 firm seeks an experienced Programmer/Analyst or Systems Analyst to support major financial packages. Growth potential. ***To $45,000.***

***VAX COBOL Programmer/Analyst*** (361-01) Growing Orange County company with ultra-modern computer facility seeks professional with strong COBOL skills in a DEC VAX/VMS environment. ***To $40,000.***

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***CICS COBOL Programmer/Analyst*** (361-03) Expanding Orange County data center seeks professional with extensive CICS COBOL applications development experience. Company promotes individuals based on merit. ***To $45,000.***

***MVS Systems Programmer*** (361-04) Excellent opportunity for growth in an expanding Orange County OS/MVS-XA environment. Company offers extensive technical challenges in a state-of-the-art environment. ***To $45,000.***

***Applications Development Manager*** (361-05) Major Fortune 100 distributor/manufacturer with corporate IBM 3090 MVS-XA data center in Orange County seeks an individual to manage staff of twenty COBOL Programmer Analysts, Systems Analysts and Project Leaders. Degree required. ***To $68,000.***

***Senior Systems Analyst*** (361-06) Fast-growing Orange County manufacturer seeks an excellent communicator with major software package implementation experience. DEC VAX experience is preferred. ***To $40,000.***

***Project Leader*** (361-07) One of Orange County's major companies seeks a professional with seven or more years of business systems development/implementation experience in an IBM 30XX MVS-XA on-line and data base environment. Experience should include supervision of Programmer Analysts and full project life cycle responsibility. ***To $53,000.***

***Programmer/Analysts*** (371-01) Major bank in San Diego is expanding on-line services requiring network and LAN experience, ATM experience or IBM 4700 experience. Relocation expenses paid by employer. ***To $45,000.***

***Network Software Specialist*** (371-02) Leading manufacturer of CD ROM products seeks senior level professional to provide direction in the development of networks to interconnect microcomputers. Knowledge of Novell or 3COM products is preferred. Relocation expenses fully paid. ***To $70,000.***

***Data Base Design Specialist*** (371-03) Large engineering and manufacturing firm in San Diego is expanding data base support. Growth opportunity is available for IMS expert with emphasis in tuning, data dictionary and standards. Relocation expenses fully paid by employer. ***To $50,000.***

***IBM 8100 Programmer/Analyst*** (371-04) Major San Diego financial services firm is developing multi-million dollar national distributed system. Professional is sought with one to ten years of experience with IBM 8100 (DPPX) using either CSP or COBOL. Full relocation paid. ***To $48,000.***

***Software Engineers—C*** (371-05) Rapidly expanding firm seeks software engineers with three to five years of experience to develop real-time communications software using C. ***To $41,000.***

***PICK Programmer/Analyst*** (371-06) Dynamic, employee-owned company seeks Programmer/Analyst with four years PICK experience (prime computer preferred). Will develop and maintain business applications in a manufacturing environment. Excellent compensation and benefits. ***To $38,000.***

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***COBOL/CICS Applications*** (501-03) Prestigious billion dollar company located in North Dallas seeks professional with four or more years of COBOL and CICS applications experience. Degree preferred. ***To $38,000.***

***Telephony Systems*** (501-04) Three or more years of microcomputer software development in a communications environment is required. C and ASSEMBLER experience preferred, but will consider one or the other. Northern Dallas suburbs. ***To $47,600.***

***RPG III/System 38***—High Profile Company (501-05) Major Dallas corporation seeks System 38 financial systems developer. Strong technical skills and consulting background desired. ***To $38,000.***

***Programmer/Analysts*** (511-01) Large vendor seeks several Programmer/Analysts with four years of COBOL or ALC with CICS and VSAM experience. Development experience in banking applications is strongly desired. Excellent benefits and career growth opportunities. ***To $40,000.***

***Senior Programmer/Analysts*** (511-02) Fortune 200 company, with diversified national exposure, seeks several DB2 Analysts. New development and customer support experience are preferred. Excellent opportunity for project management. ***To $48,000.***

***Software Developers*** (511-03) One of the nation's largest IBM utility software companies is seeking several MVS utility software developers. Extensive ALC development experience under MVS is required. MVS and VM internals knowledge is desired. ***To $65,000.***

***Programmer/Analysts*** (511-04) Multiple openings exist in the Dallas/Ft. Worth Metroplex for RPG III/System 38 Analysts. Several levels are available, from Programmer to Senior Analyst. Excellent opportunities for management positions. ***To $45,000.***

***Information Center Analyst*** (531-01) Professional with software and hardware experience is sought to evaluate and install software packages and develop programs on both mainframes and PCs. Knowledge of PC communications a plus. ***To $35,000.***

***Senior Programmer/Analyst*** (531-02) Fortune 100 company located in Houston seeks Senior Programmer/Analyst with CICS experience to participate in new development projects using structured methodology. ***To $45,000.***

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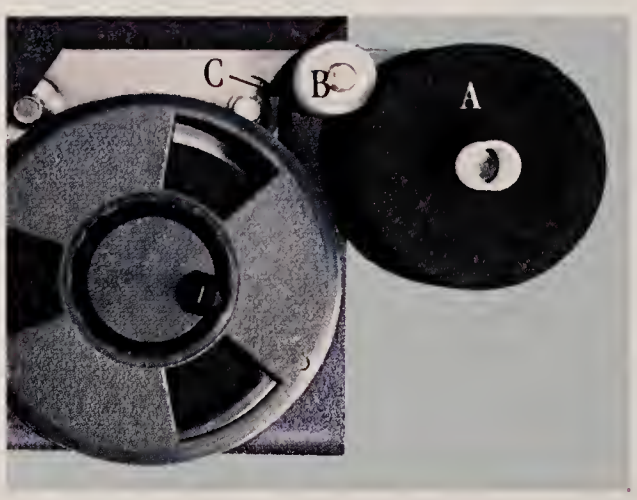


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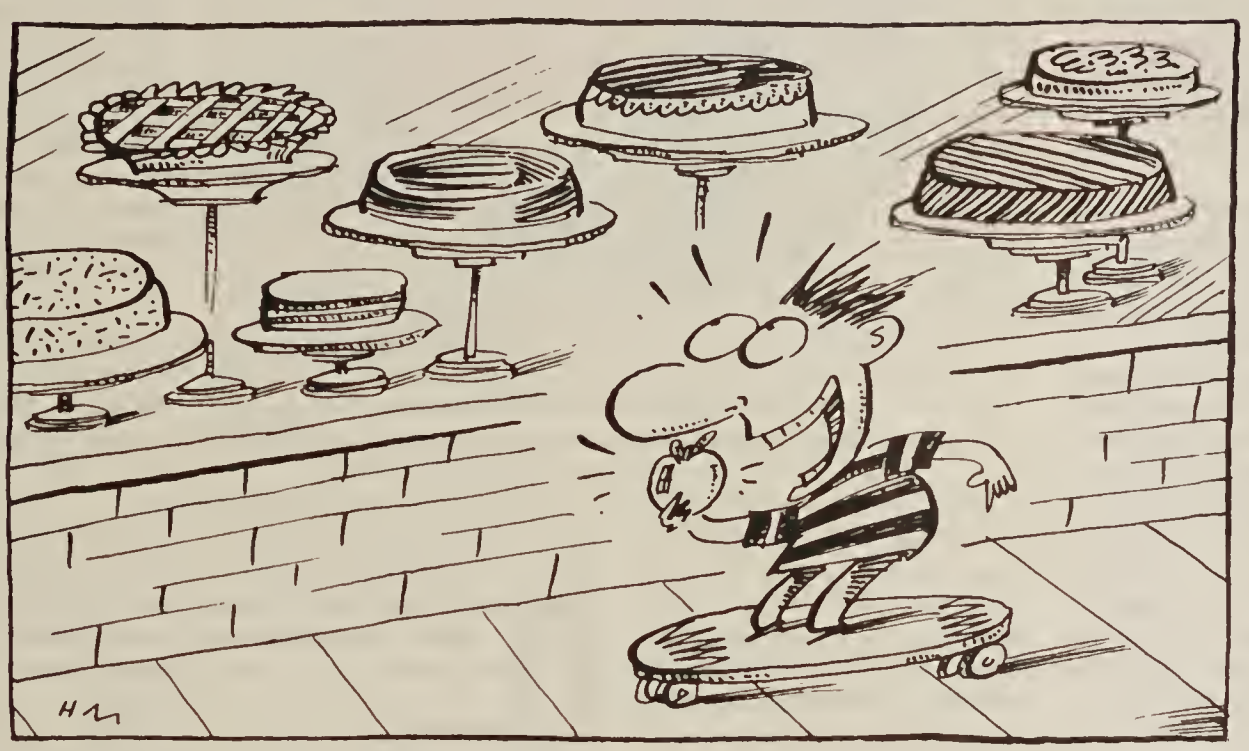
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**Price sensitivity and resistance to exotic features among current users cause laser printer vendors to eye untapped markets**

# USERS FAVOR BASIC FARE

BY MICHAEL BALL



HAL MAYFORTH

Infiltrating the data processing environment is becoming a high priority for laser printer vendors. So far, only a relatively small number of organizations have opened the door of this sanctum; most prefer to stick to the known and trusted area of impact line printers. But vendors are gearing up to make stronger appeals to high-volume users, such as MIS managers, design engineers and architects. Initially distracted by the flurry of interest in desktop publishing and preoccupied with establishing a beachhead in the office, laser manufacturers have only recently begun to concentrate on the special needs and interests of this big-ticket market.

Breaking into DP and other high-end applications such as computer-aided design (CAD) will not be easy, especially given the current price levels for laser printers equipped to operate at the speeds and resolutions most data centers require. These machines, which may print more than one million pages per month, cost approximately $200,000.

Price by itself is not considered to be as much an issue at this level as it is in the office market, which, according to estimates from Dataquest, Inc., currently accounts for approximately 90% of laser sales.

Cost sensitivity declines as throughput requirements increase, according to Joe Ryan, laser products marketing manager at Dataproducts Corp. in Woodland Hills, Calif.

Cathy Dingman, associate director of the Intelligent Copier/Printer Market Requirements Service at CAP International, Inc., a market research firm in Marshfield, Mass., says that while most users want their ideal printer to cost less than $10,000, 40% of large-site users say they are prepared to pay more than $75,000 for a machine that meets their requirements.

Ball is a free-lance writer based in Boston.

MIS shops need to be convinced, however, that high-speed laser printers can replace the traditional line printer and that they exhibit the reliability and flexibility to perform in the data center. As one laser convert puts it, "Our margins are very close, and we don't buy a printer just because it looks nice." Lou Amadio, operations manager at Big Bear Stores Co. in Columbus, Ohio, adds, "Most data centers I know think the same way."

### Running the workhorse

Reliability and duty cycles are key considerations and ones for which lasers will be hard-pressed to compete with line printers. As Corinne Kody, manager of the Printer Market Program at market research firm International Data Corp. in Framingham, Mass., notes, "Line printers are still the workhorse in many companies. They have an untouchable mean-time-between-failure rate. Those things don't ever die."

Other features likely to be considered important by high-end users are variable-size paper feeding systems and multiple-part forms capability. While lasers can often print more than one copy of a form as fast as other printers can print one multiple-part form, some such applications still demand impact printing.

Eric Gaer, director of marketing at Personal Computer Products, Inc., a laser printer vendor

# Basic fare

FROM PRECEDING PAGE

in San Diego, says he has heard enough requests from MIS shoppers to convince him that "it is becoming more and more important to offer VAX and mainframe links."

New features geared to satisfy the requirements of this target group are already beginning to appear. For example, many medium- and high-speed lasers have begun to feature line printer emulation.

In addition, some early converts are finding that laser vendors are willing to listen to and act on their suggestions.

### Gave it a try

Despite his reservations, Amadio introduced laser printers at Big Bear, not as a replacement for line printers but rather as a special-purpose addition.

Amadio says the grocery chain turned to Storage Technology Corp.'s 103 page/min machines when it needed to begin printing shelf price tags in-house but could not get the varying type sizes on a line printer. The weekly rush to get special and changed prices to a service house for printing and lamination was expensive and slow.

The search for a printer that could provide the necessary speed, a variety of typefaces, graphics and cold process brought Big Bear to laser printers.

With the power of an IBM 3090 mainframe and a bank of line printers in-house, the company had only part of the system; Storage Technology took care of finding the rest.

"They said they could do what we needed, including finding the right software, but we weren't sure," Amadio says. "So we told them to go ahead, and we'd pay them if it worked. Much to our surprise, they said OK."

What with debugging the system and fiddling with a custom laminating machine that Big Bear added, Storage Technology wound up subsidizing the experiment for the better part of a year. "They didn't get a penny for about nine months," Amadio says.

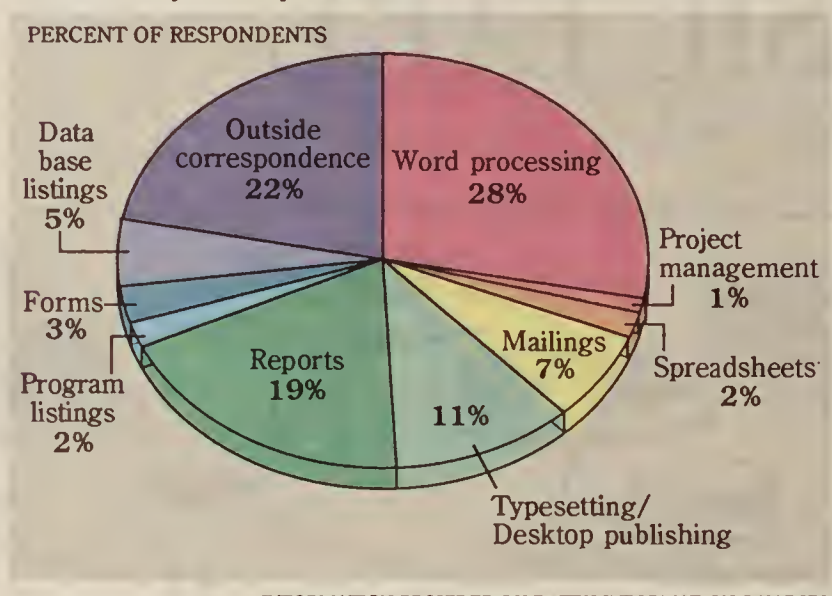
The vendor's flexibility has produced a satisfied customer and partial convert. Amadio says the laser has worked better than anyone had hoped: It paid for itself within a year and gave the company the ability to respond to competitive pressures.

To everyone's surprise, "there was tremendous latent demand once the laser printer was installed," Amadio says. The tag printing now takes less than 12 hours per week.

Other members of the MIS staff found the laser printer's graphics and multiple typeface capabilities what they had been waiting for.

## Fitting the buy to the application

*Text-based applications are a major motivating force behind the decision to buy a laser printer*




INFORMATION PROVIDED BY DATEK INFORMATION SERVICES
CW CHART

> EARLY converts are finding that laser vendors are willing to listen to and act on their suggestions.

Now demand has increased so much that a second printer of the same type has been ordered. Big Bear is also looking at other applications, such as printing its roughly 18,000 W2 forms — all originals — on lasers, at a higher speed and without the bother of carbons.

As for its line printers, the firm got rid of one but kept two IBM 4245s. Amadio says if he had been leasing those printers, he might have dropped another. But because the company owns them, Big Bear keeps the printers for jobs that require impact printing.

Another pleasant shock to the company was that supplies and maintenance for the laser printer cost a little less per line compared with the impact printer.

Amadio says the $15 for ribbon vs. the $13 for toner is about equal, and the $400 vs. $500 per month for maintenance is acceptable, because line printers are six times slower.

### Red-carpet treatment

Another early adopter, who asked for and received special treatment from a vendor, is a large Midwestern office furniture manufacturer.

The manager of business systems at that firm already has 100 Xerox Corp. 4045 10 page/min machines hooked by network to 2,000 IBM Personal Computers, compatibles and terminals through an IBM 3081K. He has already started a pilot project to output CAD drawings, which are crucial to custom orders.

The company shopped around 3½ years ago and convinced Xerox to sell it pre-beta-test models and help produce custom interfaces. The aim was to leapfrog typewriters and get equipment that could print letterhead and forms overlays on demand.

Having done that, the furniture maker is looking ahead to future capabilities — faster speeds, additional paper feeds, greater graphics capability and more intelligence.

### Need dominates

Some organizations are even willing to purchase on the basis of promise and potential need. One DP manager for a project team at a large financial services and credit card firm admits that his laser purchasing decisions are driven by expectation as well as need.

"Right now, I have to have two font cartridges at a time and a printer that accepts additional memory, 'sharability' and the ability to take a variety of large and small paper sizes," the manager says.

He has already added 2M to 4M bytes of memory to printers and is looking to vendor improvements for the rest. "I expect a lot more capability a year from now," he notes.

That does not seem to be an unrealistic expectation, given the rate at which laser vendors have added features to their printers in the last year. It must be noted, however, that while the majority of current users seem to be satisfied with present offerings, vendors do not always seem to have anticipated feature demands accurately.

For example, while laser manufacturers are fleshing out their catalogs with models capable of duplex, or two-sided, and color printing, duplexing is still a rare demand, even among users who are used to sending out two-sided reports to printing firms. Most users perceive color to be an overpriced frill.

In a recent survey of 1,111 sites, CAP International found that users were generally not interested in paying a premium for advanced features such as three or more colors or electronic forms storage. Very few considered them worth even a 10% increase in price.

### Get down to basics

The company found that the majority of current users were interested in the basics — quality, reliability, speed and cost.

Not surprisingly, definitions of adequate speed and cost vary by site size and usage. For the time being, "small sites have fairly low speed requirements," CAP's Dingman says.

"More than 50% find speeds under 22 page/min to be appropriate for their needs," she adds. "The median speed is 35 page/min for medium-size sites and about 75 page/min for large sites. More than 35% of large sites require speeds of more than 120 page/min."

Personal Computer's Gaer notes that his firm's 6 page/min machines are the big sellers. Law firms and insurance companies tend to require 15 page/min.

"We think eight pages per minute is fine," says David Lazor, systems analyst at Sheppard, Mullin, Richter & Hampton, a law firm based in Los Angeles.

The organization's main printing concerns are correspondence and document processing, another room," Lazor says.

Price considerations follow reasonably predictable patterns. In CAP International's study, small companies were three times as likely as big companies to have a choke point of $1,500 for a laser printer. They were more than twice as likely to need something less than $5,000.

Furthermore, according to Dick Weaver, group vice-president at C. Itoh Electronics, Inc., low-end printers dedicated to a single user are the most price-sensitive category.

When it comes to other features, CAP International found that print quality and reliability were universally considered critical. In fact, these considerations were No. 1 and 2 on everyone's lists.

The majority of users seem relatively satisfied with the current market standard of 300 dot/in., according to CAP International.

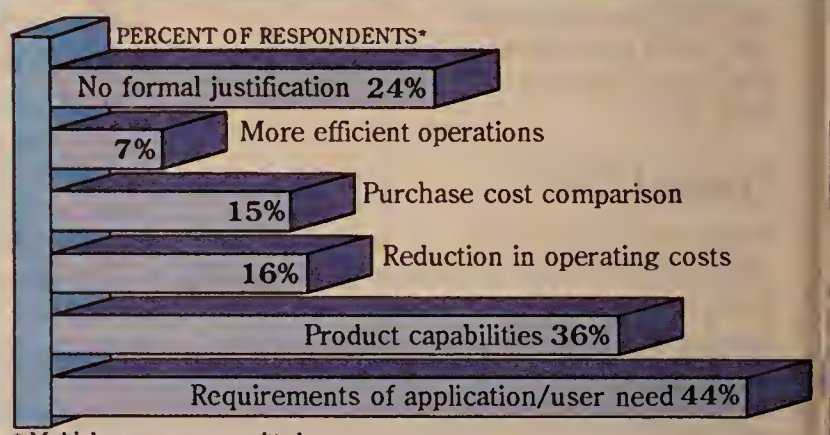
However, 40% of the medium-size sites and 45% of the large companies surveyed listed 500 dot/in. as ideal.

Reliability can, of course, bear different interpretations for users, depending on their output requirements. But generally speaking, users of both high- and low-speed models say that reliability is crucial, and neither group seems dissatisfied at this point.

At the high end of the speed spectrum, for example, Reader's Digest Association, Inc. in Pleasantville, N.Y., which runs its 206 page/min Siemens Information Systems, Inc. printers on a non-stop schedule for direct mail, reports that routine preventive maintenance has been sufficient to ward off any disruptive problems.

## User need is the best justification

*Almost half the respondents of a survey indicated they bought a laser printer because their users needed one or they were running an application that required one*




* Multiple responses permitted

INFORMATION PROVIDED BY A SURVEY OF 100 USERS CONDUCTED BY DATA INFORMATION SERVICES FOR ITS 1987 REPORT, "LASER PRINTER PURCHASE DYNAMICS USER SURVI
CW CHA

### Better than expected

Meanwhile, at Worrell Enterprises, Inc. in Charlottesville, Va., a newspaper publishing company that uses Apple Computer, Inc.'s 8 page/min, 30( dot/in. Laserwriters in place o typesetters, reliability has ex ceeded expectations, accordin

to Herbert Smith, president of the firm's Electric Knowledge, Inc. division.

Smith, whose division oversees the laser printer systems, says daily newspapers cannot accept unreliable equipment, adding that the 20 company papers using the laser printers often push the equipment beyond the rated pages per month without any problem.

Smith and his company also share the typical laser printer user's concern for service. In this case, with newspapers scattered throughout the country, the company chose a common printer from a major manufacturer to help ensure easy availability of service.

As an extra precaution, the company also offers individual newspapers the option of express-shipping malfunctioning printers to Electric Knowledge in exchange for a loaner machine. This option was offered not because of service problems at any of the locations but because next-day use of a printer is an absolute necessity for a daily publication, Smith says.

WHILE THE promise of desktop publishing has sold a lot of laser printers . . . the average laser printer has a pretty mundane existence.

Another issue frequently raised by the users surveyed by CAP International was compatibility. Like service, however, this issue seems more a preventive concern than an actual problem.

Laser printers run standard interfaces to common computers ranging from micros to mainframes, and users tend either to buy printers that are compatible with their existing hardware and software or to purchase the software and printer at the same time.

In cases in which specific, specialized emulation is required — for example, Worrell's emulation of typesetting equipment — companies usually plan to write their own interfaces.

### Not much flavor

If laser users seem, at the moment, to be concerned primarily with basic issues and features, that is because the majority of applications are currently of a plain-vanilla variety, with standard office word processing topping the list.

This may seem hard to believe, given the amount of attention lavished on desktop publishing recently. But the truth is that, while the promise of desktop publishing has sold a lot of laser printers and software and driven many vendors to offer compatibility with Adobe Systems, Inc.'s Postscript graphics, the average laser printer has a pretty mundane existence.

While a few users routinely turn out promotional materials and newsletters that could be called publishing, most rarely or never do.

Among the vendors, HP reports that standard office applications are the norm. "Since we started in 1984, the major applications have remained word processing, spreadsheets and short reports," says Cathy Lyons, an HP product marketing manager.

Both Idaho Power Co. in Boise and Sheppard Mullin are primarily in the text and numbers business. As typical laser users, both occasionally merge text and graphics for a short report, but neither claims to run the printers to their full capabilities.

"We will probably do desktop publishing later," Sheppard's Lazor says, "but we do mainly document word processing."

### Always prepared

"Later" is the operative word for many purchasers, according to Dataproducts' Ryan. He sees customers buying Postscript capability in the same way they request font and memory upgradability: Even if they do not expect to use it immediately, they want to be ready for anything.

Big Bear's Amadio makes the point that some advanced capabilities are latent freebies, available to be used at some point in the future.

"We can put a negative on a drum and run a logo on each piece of paper," he says. "We haven't done that before and didn't buy the printers with that in mind, but we know the capability is there."

Whether applications and feature requirements will remain static is still a matter of conjecture. Many vendors and some market observers believe change is in the air.

"Expectations of the user are changing rapidly," Personal Computer's Gaer says. He adds that although users currently want performance and not features, this will change.

Gaer says he sees users already shifting from a focus on purchase price to cost of ownership — money spent on consumables like toner and paper — and demanding more sophisticated features, including multiple emulations and networking capability.

### Looking for more

Angele Boyd, senior market analyst at International Data Corp., also detects a growing interest in certain features. For one, she finds users eager for greater intelligence in networked printers. "They will soon want printers that will inform the users on the

*Continued on page S4*

# The wide world of nonimpact

BY SUZANNE WEIXEL

So, you're looking for a high-quality printer — something less noisy than a 24-pin dot matrix but faster and cheaper than a laser — but you aren't sure such an animal exists? Stop worrying. Laser printers aren't the only nonimpact game in town.

Consider, for instance, ion deposition printing. Ion deposition is a page printing technology based on electrostatic image creation: Negatively charged ions are shot onto a dielectric cylinder that attracts magnetic toner to the charged areas; the toner then transfers charge onto the paper.

Jack Gittleman, operations manager at Neuberger & Berman, a New York investment banking firm, switched about 1½ years ago from laser printing to two Delphax Systems, Inc. ion deposition printers. He liked their faster speed, high reliability and lower price; a 30 page/min printer starts at $15,000.

DESKJET IS "less expensive than a laser without the noise and the paper hassles of dot matrix printers."

GEORGE ROTH
UMPQUA COMMUNITY COLLEGE

Unlike laser, ion deposition technology does not use heat; as a result, it requires less maintenance and support, has fewer moving parts, reduces energy consumption and is cleaner and safer, Gittleman says. "We had five laser printers. With two ion printers, we do about four times as much work in the same amount of time," he says.

Walter Schell, director of MIS at Rivkin, Radler, Dunne & Bayh, a Uniondale, N.Y.-based law firm, opted for a Delphax ion printer because it offered IBM impact compatibility at 30 page/min, something he says he could not find in a laser printer.

Other qualities Schell was looking for in a nonimpact printer were quiet operation and font management.

"In a professional environment, you need the quietness of a nonimpact printer. Both laser and ion printers would have given us the quiet; the ion has the added advantage of speed," he says. "Both also offer capabilities that allow us to put fonts in and customize our letterhead, thereby avoiding the expense of buying preprinted forms. Once again, the ion's speed won us over."

Thomas Clark, vice-president and computer operations manager at Liberty National Bank & Trust Co. of Louisville in Louisville, Ky., was looking for something very specific when he went shopping for a printer about a year ago: a continuous-form, laser-quality printer that could operate at high speeds yet fall into his price range. He found what he was looking for in a Honeywell-Bull, Inc. magnetographic printer.

Although new to the printer market, magnetographic technology has been used in other types of electronic devices for years, such as magnetic storage media. The technology is similar to ion deposition: After the page is written magnetically onto a rotating drum, the images are toned onto the drum with magnetic ink, transferred to paper and then fixed. A Honeywell-Bull 60 page/min printer costs about $78,000; a 90 page/min costs a little more than $97,000.

### 'Perfect fit'

"I had just avoided buying a laser printer that only took cut-sheets when I heard about magnetographic printers," Clark says. "Magnetography turned out to be a perfect fit."

The bank uses the printer to generate 12-page, complex statements for its portfolio accounts. Eventually, Liberty National hopes to use the printer for forms generation to avoid the expense of purchasing forms.

"We get 90 page/min print speed, good quality, continuous-feed operation and forms design capabilities — all at a price range we can afford," Clark explains. "The big laser printers can cost up to $350,000."

Liquid crystal shutter (LCS) technology is becoming less expensive than ion deposition or magnetography. It uses fixed optics, which allow dot size, light source and drum clearance to be kept uniform across each line.

Price was not the only factor that led Dave Williams, vice-president of engineering at Storage Dimensions, Inc. in Los Gatos, Calif., to consider an LCS printer as a companion to his laser printer. Not completely satisfied with the laser he had been using for correspondence and marketing cover letters, Williams decided to try an LCS printer. He purchased a Data Technology Corp. Crystalprint VIII for $2,500 about six months ago. "The main thing is that it offers a higher speed than the standard laser type of printer, and it's cheaper," Williams explains. "I also think the quality of the printed material is better."

Williams also liked the Diablo Systems, Inc. Diablo 630 emulation that the Crystalprint VIII offers. It allows him to use the printer with a wider variety of software packages than is available with the laser printer he continues to use. He is also able to compare the technologies in terms of reliability.

### Won them over

With the February introduction of the Deskjet drop-on-demand thermal inkjet printer for $995, Hewlett-Packard Co. won the hearts of users trying to achieve laser-quality output with minimum impact on their budgets. Drop-on-demand inkjet printers utilize ink-filled cartridges. Inside each cartridge, a heating element raises the temperature of the ink, causing it to expand through nozzles onto the page.

"For the little bit of money the Deskjet costs, why not get a printer that can do a clean, quality job?" asks Harry Potter, vice-president at Industrial Control Development, Inc., a four-man manufacturing company based in Vancouver, B.C. He had been using an IBM 24-pin dot matrix printer for technical data sheets and correspondence. But when Potter heard about the Deskjet, he went out and bought one to replace the dot matrix.

George Roth, director of computer services at Umpqua Community College in Roseburg, Ore., says he sees the Deskjet as filling the gap between dot matrix and laser printers. He claims HP will lose laser printer business to its own Deskjet. "It's less expensive than a laser without the noise and the paper hassles of dot matrix printers," he says.

Roth says he chose the Deskjet primarily for its print quality. "In all honesty, I was surprised at the excellent quality," he says. "I used to believe that unless you had a laser or a 24-pin dot matrix printer, you were never going to achieve letter quality at your workstation with any kind of speed."

"The laser printers are good, and you can't be too picky," Williams says. But when it came to the bottom line, these users found other technologies that, for them, satisfied the promises made by lasers more quickly and at less expense. •

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Weixel is a free-lance writer based in Framingham, Mass.

# Basic fare

CONTINUED FROM PAGE S3

screen when a printer is down — maybe that it sent the job to another printer."

The seeming disparity in what users are beginning to say they want and the price they are still willing to pay is typical of a relatively new technology. The promise of the most sophisticated features is alluring, but a feature also becomes a take-it-or-leave-it option if it is too highly priced.

### It can only get better

HP's Lyons agrees, likening the technology to color television in its early stages. "In the future, we expect color to be a big feature and [laser printers] to have greater intelligence, including status readbacks and the ability to query printers [with questions like] 'Do you have this font?' " she says. As with television, improved technologies and lower costs will make these features acceptable.

Marc Liebesman, C. Itoh's vice-president of marketing, notes that early users were kept out by low functionality and high cost.

"The secretary said, 'Laser! Laser! Laser!' and the manager used to say, 'I don't have $10,000.' Now they are cheap, and you don't have to call in five people and a forklift truck to service them," he says.

These may be reasons enough to bring laser printers into the office environment, but the jury is still out on whether these machines can lure large numbers of MIS managers away from their trusted impact printers.

Bhanu Bhattasali, director of the electronic printer industry service at Dataquest in San Jose, Calif., says he expects that MIS will eventually make up a large portion of the laser printer market, even though office word processing will remain the major application.

### Still wondering

Still, for many MIS shops such as the one at Idaho Power, the technology remains more intriguing than practical.

Idaho Power went through a careful evaluation process before deciding that laser printers were appropriate for other departments. It then selected QMS, Inc. printers with a variety of speeds to match throughput requirements.

The utility carefully evaluated its printing needs and cost-justified each purchase, according to Glenn Lake, who manages hardware and software for the company. It demanded other features, such as multiple fonts that could be downloaded from the mainframe as needed, and matched those to departmental needs as well.

But the same evaluation process that helped Idaho Power justify lasers for office use has, so far, ruled them out for its MIS operations. The price/performance ratio has not yet improved to the point at which MIS would consider committing itself to the technology, Lake says. But the utility continues to look at the question on an annual basis. •

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# Reading past Postscript

BY CHRISTINE RIVERA

Page description languages (PDLs) are programming languages that give users ultimate control over laser printer output and access to a standard command language that many different printers can use. PDLs supply powerful commands that enable users to size, scale and rotate fonts and create, edit and manipulate graphics images.

The most popular PDL is Adobe Systems, Inc.'s Postscript. Establishing an early lead in the market with Apple Computer, Inc.'s Laserwriter, Postscript has effectively become the industry standard.

Two PDLs that lost their challenges to Postscript yet remain popular with large-system users are Imagen Corp.'s Document Description Language (DDL) and Xerox Corp.'s Interpress. DDL, which Imagen uses in its high-speed lasers, is supported by many document processing and computer-aided design applications in the Unix and Digital Equipment Corp. VMS environments.

Interpress, built into Xerox's high-end laser printers, is used by applications in Ethernet networking systems and will probably continue to be a standard in that environment for some time.

> UNLESS Postscript fails to deliver in the network and multi-user environments, it will remain the favorite in desktop publishing.

Right now, there is a great deal of activity in the area of Postscript clones — Postscript-compatible interpreters being offered for a variety of operating systems and environments. Although there are, as yet, no printers on the market utilizing these clones, they have garnered a significant amount of attention and may soon become a real factor.

These languages claim compatibility with Postscript commands, higher speeds and lower licensing fees than Postscript. Some even offer compatibility with more than one PDL. Control-C Software, Inc.'s CCS-Page interpreter, for example, supports Interpress as well as Postscript commands.

The most popular Postscript clone is provided by Phoenix Technologies Ltd. Both Canon U.S.A., Inc. and Toshiba Corp. have licensed the Phoenix interpreter, which claims speed advantages over Postscript and will initially incorporate the interpreter into upgrade controller kits for their existing laser printers.

The only hitch with the clones may be compatibility. Until some clone interpreters have been tested in actual use, these questions will remain unanswered. Also, while Postscript's syntax has been device-independent, the possibility exists that Adobe will devise a way to prevent others from successfully cloning new releases.

### Staying on top

Whether or not Adobe takes preventive action, there are several reasons to believe that Postscript will continue to be the dominant PDL. First, it already has a strong foothold in the market. Virtually all of the desktop publishing packages for both the Apple Macintosh and IBM Personal Computer support Postscript, and popular word processing software packages, such as Wordperfect Corp.'s Wordperfect and Microsoft Corp.'s Word, provide drivers for it as well.

Because of this software support, printer manufacturers are eager to provide Postscript interpreters with their models. Imagen and Xerox are starting to offer Postscript support in their systems. Furthermore, IBM's endorsement of the current standard will certainly increase application support for Postscript.

Another consideration is the fact that typesetting systems now offer Postscript-compatible output. What this means is that users can proofread their documents on a laser printer and then run them through a typeset-quality printer for final output.

One promising new development is the adoption of Postscript for graphics display devices. With Display Postscript, users will be able to see on-screen the same fonts that will be produced by the printer.

This capability will also allow the development of more flexible user interfaces. For example, by combining Sun Microsystems, Inc.'s Network Extensible Window Systems, a Postscript-compatible graphics interpreter, with X Windows, a public-domain programming environment, AT&T and Sun hope to create a standard look and feel for the Unix environment as well as provide networking support.

There are still a lot of questions surrounding this area of development, however. The current Apple "look and feel" lawsuit, in which Apple claims that Microsoft Corp.'s Windows 2.0 and HP's New Views interfaces violate Apple's copyright, may slow development in this area.

Another reason to believe in Postscript's continuing strength is Adobe's demonstrated commitment to keeping up with market developments: Heeding the clamor for color within the industry, Adobe has recently announced the addition of color commands to its Postscript interpreter.

One of the main complaints vendors have about Postscript is that it is slow. However, the fault here seems to lie not with Postscript itself but with printer controller design. In fact, newer controller designs have all but eliminated performance problems.

Unless Postscript fails to deliver in the network and multiuser environments, it will remain the favorite in desktop publishing. The fact that it is now being cloned is evidence of the stability of its position as the standard PDL.

Chances are that even more clones will emerge before too long, helping to push the development of network and multiuser support, improved speed and, yes, color. •

Rivera is a New York-based microcomputer consultant whose specialties include testing laser printers with various applications software.

# The effect of yen on engines

BY ROBERT MURRAY

The fluctuating value of the Japanese yen, combined with political and technological challenges, has forced Japanese laser printer vendors to look hard at their manufacturing and marketing strategies. Japanese companies have had to re-evaluate plans to keep laser printer production entirely within their nation.

Most laser printers today are based on print engines manufactured in Japan. According to a recent study published by Waltham, Mass.-based Datek Information Services, Japanese manufacturing has become less competitive because of the yen's rise.

The combination of manufacturing print engines in Japan and importing them to the U.S. for sale has become very expensive because of the yen/dollar imbalance. This is coupled by reverberations from other East/West trade tensions that influence export pricing and by today's international political and economic climate.

In 1985, when a large number of engines from Japan reached the U.S., the average exchange rate of the Japanese yen against the U.S. dollar was 238. This favorable circumstance fostered tremendous interest in laser printers. It was then that Hewlett-Packard Co., Apple Computer, Inc. and Digital Equipment Corp., among others, first introduced laser printers based on Japanese engines.

Since then, the value of the yen has risen steeply against the value of the dollar, recently hitting 123.75 yen to the dollar. While there is much speculation regarding the long-term implications of the yen's rise, one immediate difficulty faced by Japanese manufacturers is the relative cost increase of Japanese printer engines to U.S. and Western European vendors.

To complicate things, protectionist sentiment and actions from countries trading with Japan are affecting trade. The U.S. and Western European countries have imposed tariffs against Japan in hopes of coercing that nation to open its domestic market to the rest of the world and to control pricing on exports.

End-user prices for laser printers have risen recently, particularly in the workstation and office cluster environments. The average list price increase has been about $225.

### Responding to the rise

Predictions that increased competition would precipitate lower prices and that sub-$1,000 laser printers were imminent have changed or been modified drastically. Many vendors have either raised prices, taken losses or withdrawn nonimpact printers from the market.

Since laser printer engines are manufactured almost exclusively in Japan by companies such as Canon U.S.A., Inc. and Ricoh Corp., all vendors of Japanese laser technology selling in the U.S. have had to face waning profits.

While major vendors with established laser product lines continue to find success through sheer volume and name recognition, less established players are struggling to find a price/performance balance for their products that will allow them to compete successfully.

CAP International, Inc. in Marshfield, Mass., expects the U.S. market for nonimpact printers to continue to grow through 1992.

For 1988, CAP projects that 953,000 nonimpact printers will be placed, 99.37% of which will be for the workstation and office cluster environments. In 1986, 371,000 nonimpact printers were placed, and 98.65% of those were for the workstation and office cluster environments.

The U.S. and Western Europe represent the largest potential markets for nonimpact printers.

Not surprisingly, international manufacturing firms are concerned with delivering price-competitive products to capitalize on that growth potential. For that reason, some Japanese firms have considered manufacturing nonimpact printers in these markets.

Many have chosen to gradually migrate manufacturing to the U.S. In some cases, these companies are already producing dot matrix printers, copiers and other office equipment here. At least one Japanese vendor, Canon, has announced it is building laser printer engines in the U.S. However, this will reportedly not affect pricing this year.

In general, low-end nonimpact printer prices are not expected to drop in the near future. Although some prices may stay the same, vendors that have resisted price hikes to date may have to raise them.

HP's Deskjet represents one alternative nonimpact technology that carries a lower price tag. The Deskjet is manufactured in the U.S. by HP and is not subject to currency pressures. In a period of five to 10 years, the prices of other printing technologies will also drop as the technologies mature.

While large-scale production of laser printers remains in Japan, if the currency situation continues, the idea of domestically manufactured printers — either laser or another technology — may become a real and practical alternative. •

## Changing times, higher prices

*Some printer vendors have raised prices in response to fluctuations in the value of the yen vs. the dollar*

| Vendor | Model | Print engine | Price increase |
|---|---|---|---|
| Toshiba | Pagelaser 12 | Toshiba A739 | 2% |
| AST Research | Turbolaser/PS | Ricoh LP4081 | 19.5% |
| Ricoh | PC Laser 6000 | Ricoh LP1060I | 4% |
| Epson America | Go-3500 | Ricoh LP1060I | 13.6% |
| Panasonic | Laser Partner | Panasonic KX-P4450 | 29.8% |
| Canon U.S.A. | LBP-8 II | Canon LBP-SX | 10% |
| Hewlett-Packard | Laserjet Series II | Canon LBP-SX | 4% |

INFORMATION PROVIDED BY CAP INTERNATIONAL, INC.
CW CHART

Murray is a market analyst for CAP International, Inc.'s Intelligent Copier/Printer Market Requirements Service.

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To work with the Printer Engineering Group, you'll need a BS (MS preferred), and a minimum of 4 years' experience. A background relevant to printers with analog and digital hardware design and firmware design is necessary, as well as the ability to design interface boards. Part of your responsibilities will be to manage the technical development of vendors. Travel is necessary.

Sr. Staff Engineer/ME

To work with the Printer Engineering Group, you'll need a BS (MS preferred), and a minimum of 4 years' experience. General knowledge of all aspects of the mechanical design of printers and the ability to perform design/analysis of mechanical mechanisms and materials are needed. Part of your responsibilities will be to manage the technical development of vendors. Travel is required.

To apply, please send your resume to: APPLE COMPUTER, INC., Human Resources, Dept. CE19CW, 20525 Mariani Ave., MS9-C, Cupertino, CA 95014. Principals only; no phone calls, please. We are an equal opportunity employer.

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# VENDOR VIEWPOINT
# Tightening the lid on maintenance cost

BY JOHN RADCLIFFE



With each new release, the laser printer is becoming more sophisticated — and more trouble resistant. Improved internal error detection provides more information for operator intervention, thus reducing downtime.

In addition, users can be more involved in the installation and initial setup of the printer. User understanding of which consumables, such as toner and print drums, must be replaced — and how and when to do it — reduces service calls.

Service organizations remain an important part of the maintenance process. Calling in a team of product support specialists is the simplest way to fix complex laser printer problems, such as engine failure, particularly since these printers are more mechanical in nature than most other types of office printers.

Still, much of the mystique has disappeared from servicing laser printers. The biggest obstacle for users to overcome is terminology. New phrases such as drum charge corona and transfer and separator charge have been added to their vocabularies. One simple but important factor in laser printer maintenance is keeping the equipment clean. When this is done, especially in conjunction with regularly scheduled preventive maintenance, one-third of all service calls may be eliminated.

Most operator manuals provide excellent instructions to guide informed users through the cleaning process. The only tools required are a special toner vacuum, alcohol, Q-Tips and a soft cloth. Some of the more common service calls involve the setup or configuration of a specific host computer, emulation differences, print quality and paper handling problems.

> MUCH OF the mystique has disappeared from servicing laser printers. The biggest obstacle for users to overcome is terminology.

For instance, users may find an interface program such as Convergent Technologies, Inc.'s Generic Print Service can cause frustration when trying to coordinate all software and hardware and ensure that all available fonts perform properly. Incorporating graphics and/or pictures only adds to the challenge.

One significant source of difficulty is, "Which machine do I have a problem with?" A laser printer may be purchased from one vendor but have the name of a second vendor on it and require the interface logic of a third. This can cause a great deal of confusion in choosing the correct manual to use in diagnosing the problem. Many vendors do not include all the necessary status information related to each part of their product.

Users are becoming more informed about their systems — both hardware and software. They are able to give better information to the service representative, which minimizes the time and expense of a service call. But even better, informed users and improved printers are making the maintenance process an easier inside job. •

Radcliffe is a senior product specialist at Momentum Service Corp. in Freement, Calif.

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# VENDOR VIEWPOINT

# Keep the paper; get rid of the paperwork

BY RONALD CAMPBELL



People like paper — it is paperwork they don't like.

Paper, with its high-resolution, nonglare surface, is easier to read than a monitor screen and more convenient to annotate and pass on to a colleague. It has substance and dimension. Most people can probably pull a letter out of a pile on their desk or recognize a memo in a file in a matter of seconds. Paper, however, is a static medium and a poor interface for conveying dynamic information.

So rather than offer users a paperless office, future document processing systems will be designed to support a "paperwork-less" environment.

As laser technology develops, demanding executives who want to gain a competitive advantage will require document processing systems capable of exploiting information in both document and electronic form. These systems will convert paper to electronic files to be processed in an office that has eliminated much of its paperwork and then convert those electronic files back to paper as requested.

AS PRINTING and scanning technologies develop, advanced printers will combine intelligent document-recognition scanners, facsimile and duplicating capabilities.

In a paperwork-less office, paper documents will be integrated into the system, but the paperwork will be processed electronically. An insurance company, for example, might scan policy applications into the system for evaluation and completion by underwriters, who would then review and process the documents on their workstations. New policies could then be produced on laser printers to be mailed to clients, and the completed applications could be stored electronically.

### Scanning the situation

From paper to electronic processing to paper: The ability of advanced document processing systems to enhance individual effectiveness by streamlining information handling in this manner will depend on two things. First, and most important, is the continuing evolution of low-cost printers capable of producing high-quality and varied output at high speeds.

The second element is the development of intelligent document-recognition scanners capable of digitizing virtually all kinds of type, graphics, halftones and forms. Once scanned, the document could be enlarged or reduced, merged with other files, revised or reproduced.

As printing and scanning technologies develop, advanced printers will combine intelligent document-recognition scanners, facsimile and duplicating capabilities. A typical scenario might progress as follows:

A colleague walks into your office with a research survey that includes important findings for a projections report you are drafting. Placing the document on the desktop printer/scanner attached to your workstation, you automatically scan the document into your system and print an extra copy to use as notes.

Later, as you edit the report, you pull the survey data into a window on your screen and incorporate it into the document without keying any of the information. Then you print a draft and make a few copies. Having made the final revisions, you send an electronic master to the company's networked printer in the centralized data processing department.

Since your boss is on a business trip in Europe, you also transmit the electronic master to a printer in the office he is visiting. It is printed there, and he is able to review the report before meeting with corporate officials the next day.

Printers tied to document processing systems such as these will allow users to decide when and where they want to access documents. In the future, anyone will be able to send you a memo, but you will determine if you generate it on your desktop in the office, on your home printer or on a multifeatured, centralized printer.

With these systems, the control of information and decisions about distribution will be brought closer to users. •

Campbell is corporate vice-president and general manager of product and systems architecture at Xerox Corp. in Webster, N.Y.

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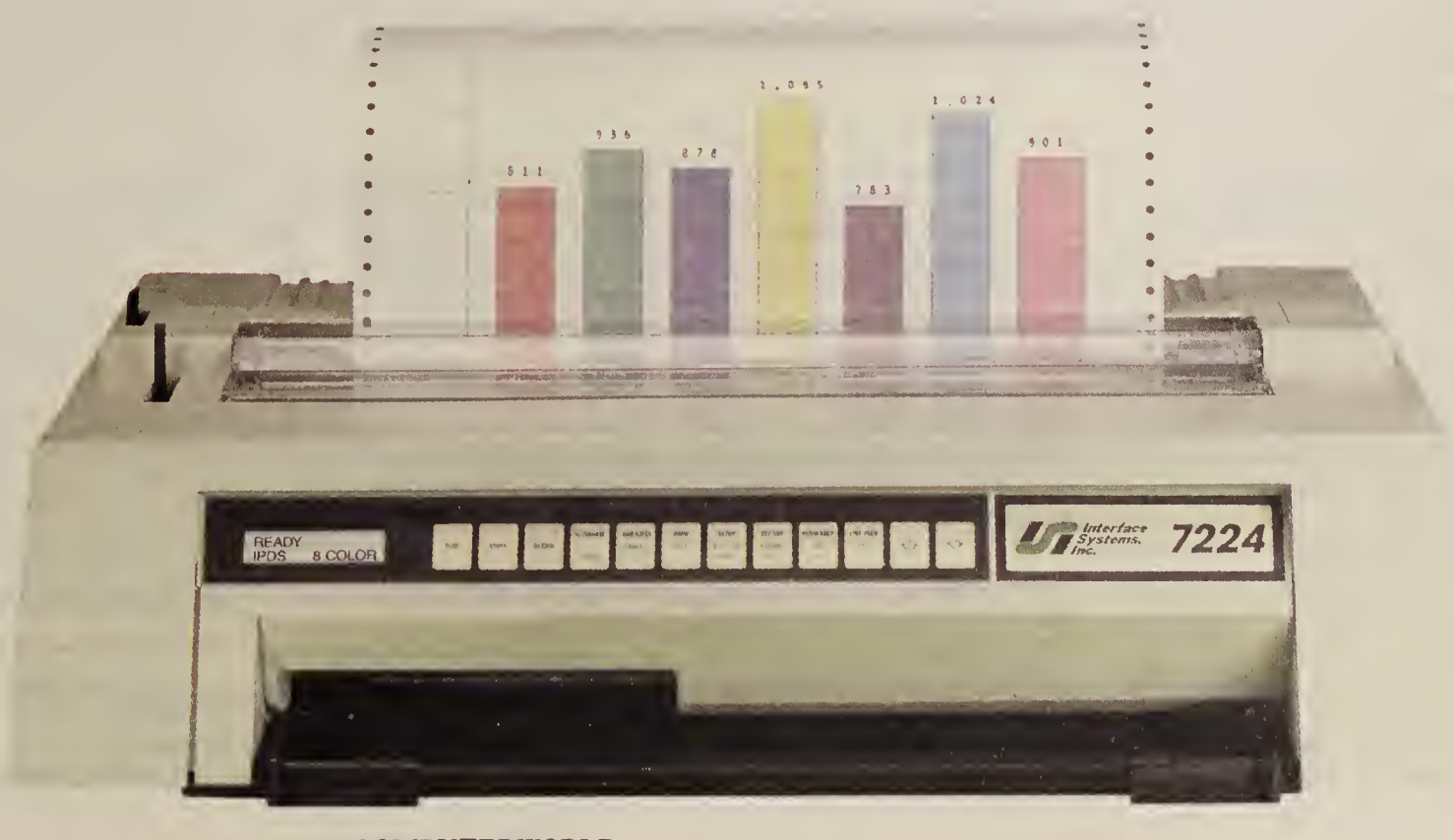
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# But do you *want* color on your desk?

BY SUZANNE WEIXEL

Ready or not, color printing has come to the desk top. But who is going to use it? And for what?

To combine Adobe Systems, Inc.'s Postscript with color, are users willing to spend $30,000 for output that, in the words of one industry observer, looks like it was done with a crayon? Does Hewlett-Packard Co.'s Paintjet offer enough appeal over, say, HP's own Deskjet?

"I suppose I could print out letters in different colors. But that doesn't really justify the cost," one Deskjet owner says.

Color is obviously more suited for certain applications, explains Angele Boyd, senior market analyst at International Data Corp. (IDC), a Framingham, Mass.-based market research firm. But the fact that it has yet to reach the typical, everyday user is also a reflection of both its cost and a general lack of user understanding.

"The typical user is not widely educated in the use of color and, therefore, does not require color on a typical basis," Boyd says, adding that this type of user is often inexperienced when it comes to thinking in terms of color and design.

Some users who give a lot of thought to color printers still find they come up short in both the number of practical applications the printers support and their cost.

"We currently don't have a need for a color system," says Walter Schell, director of MIS at Rivkin, Radler, Dunne & Bayh, a Uniondale, N.Y., law firm.

"I can see it coming — graphics presentations are becoming part of the legal industry. But right now, it would take me more than a year in billable time to make back the $5,000 or $6,000 it would cost for just a cheap but decent plotter," he says.

### Special of the day

According to IDC's Boyd, color printing appeals more to niche markets than to the average user. And within those niches, two user groups appear to be emerging: professional business users generating intensive graphics output and high-end users in the engineering or graphic arts fields.

Price is one factor in the slow diversification of high-end color printing systems. For example, prices for high-end color systems from Iris Graphics, Inc. start at $75,000.

However, Jim Smith, the company's marketing manager, says, "For someone who has just spent $1.1 million on a computer system, it's hardly an unreasonable cost."

Even QMS, Inc.'s Postscript-compatible Colorscript 100 thermal transfer printer, at $25,000, is beyond the price range of the average desktop publishing user. QMS is targeting its printer at graphics design and electronic publishing environments.

### Seeing black-and-white

"It's the people who take computer imaging for granted who take color for granted," claims Dave Kay, president of Novachrome, Inc., which provides computer graphics system integration for organizations such as law enforcement agencies, industrial development firms and sportswear designers.

Kay compares users' attitudes toward color printing to the difference between black-and-white and color photography. "When you want a color photograph, you don't settle for black-and-white, and you don't mind paying a little more," he says.

But Kay says he also sees the cost of quality color printing coming down from the current six-figure price tags of high-end systems.

"Depending on your needs, there's HP's Paintjet. It's not going to give you an image from a raster frame buffer with deep color, but for $1,400, its quality is astronomical.

"In the $6,000 to $7,000 price range, you can now get Howtek's Pixelmaster," Kay continues. "Its output looks more like the color photographic printing people are used to seeing. Also, the cost per print is very, very low."

### Mass appeal

One area that could potentially form a bridge between the office and engineering markets is presentation graphics, which would include overhead transparencies. Boyd says she sees that area as one of the few applications with mass market appeal.

In presentation graphics, "users are asking, 'Can I do it cheaply?' " Boyd says. "They don't want to spend the money on a printer that's going to sit around gathering dust waiting to do the occasional overhead. They want something they can use for general business applications as well."

In Boyd's view, Paintjet, because of its ability to print in both color and black-and-white quickly and cleanly, meets the requirements demanded of a mass market system.

"It's not superexpensive, it's a desktop, and it's not just limited to graphics applications," she says.

Deborah Berke, technical services analyst at American Mutual Insurance Co. of Boston in Wakefield, Mass., recently began using Paintjet in place of an HP plotter. She uses it for presentation graphics, transparencies and to supplement reports with graphics.

Berke says 85% to 90% of the work is done in color. Her company also uses Paintjet for black-and-white text.

> "WE CURRENTLY don't have a need for a color system. . . . It would take me more than a year in billable time to make back the $5,000 or $6,000 it would cost for just a cheap but decent plotter."
>
> WALTER SCHELL
> RIVKIN, RADLER, DUNNE & BAYH

Not all users are sold on Paintjet's all-around usefulness. George Roth, director of computer services at Umpqua Community College in Roseburg, Ore., reserves his Paintjet — which requires special paper — for when he needs color. He purchased it at the same time that he bought 15 HP Deskjet printers.

"Although Paintjet does good-quality general business applications," he explains, "the paper is expensive. We have the Deskjets for general work."

### Marching on

Despite the price and quality discrepancies between high- and low-end color printing, Iris Graphics' Smith sees the color market expanding in all directions.

"Color is a vanguard," he says. "Users are growing up, learning what to ask for, and technology is providing more alternatives. The marketplace is going to ask the vendors to accommodate different types of applications.

"From a practical standpoint, we will have to become device- and size-independent. That's what users are going to require." •

# Top-selling nonimpact printers

*A listing of top sellers of selected nonimpact technologies other than laser*

## Ink-jet printers

**Canon U.S.A., Inc.**
**(516) 488-6700**
**BJ-130**
Serial bubble-jet printer. Prints at 110 to 220 char./sec. at a resolution of 360 dot/in. Includes a built-in automatic sheet feeder and uni- and bidirectional printing. Wide-carriage printing for spreadsheet and data base use.

**Diconix, Inc.**
**(800) DICONIX**
**Diconix 150**
Fully functional portable printer runs on rechargeable batteries or electricity. Creates graphics and prints on transparencies. Prints 50 to 140 char./sec. Up to 235 different characters are supported. Offers Epson America, Inc. and IBM compatibility.

**Diconix 300W**
Prints 40 to 310 char./sec. Supports 262 characters and up to 256 additional downloadable font characters. Prints at resolutions of 96 by 96, 192 by 96 or 192 by 192 dot/in. Emulations include Epson FX-80/100 and IBM Proprinter. Includes continuous form and transparencies.

**Dijit 1**
Prints at 20 page/min with a resolution of 300 dot/in. Duty cycle is 70,000 page/month. Emulations include Xerox Corp. 2700, Diablo Systems, Inc. 630 and IBM Graphics Printer and Proprinter. Paper handling features include duplex and label printing, transparencies and 500-sheet input capacity.

**Hewlett-Packard Co.**
**Contact local sales office**
**Deskjet**
Drop-on-demand laser-quality printing. Prints text in multiple fonts and full-page graphics at 300 dot/in. Prints at speeds of 120 (letter quality) and 240 (draft quality) char./sec. Includes resident fonts. Two accessory cartridge ports extend font capability and provide for Epson America, Inc. FX-8 emulation.

**Thinkjet**
Portable ink-jet dot matrix printer. Prints 150 char./sec. at resolutions of 96 by 96 dot/in. for graphics or 192 by 96 dot/in. for text. Prints 200 pages between recharges. Offers Epson MX-80 compatibility.

**Quietjet**
Wide-carriage, letter-size series of personal printers. Prints at 40 char./sec. in near-letter-quality mode and 160 char./sec. in draft mode.

## Ion deposition printers

**C. Itoh Electronics, Inc.**
**(714) 660-1421**
**Megaseries**
Three models featuring 300 dot/in. resolution and speeds of 30 or 45 page/min. Offered with line printer emulation, a Motorola, Inc. 68000-based graphics controller or with a controller offering Digital Equipment Corp. LNO3, Hewlett-Packard Co. Laserjet II, Tektronix, Inc. 4014 and Diablo Systems, Inc. 630 emulations and optional Adobe Systems, Inc. Postscript compatibility.

**Delphax Systems, Inc.**
**(617) 961-2312**
**S3000G**
Operates at 30 page/min with a resolution of 300 dot/in. Emulates Hewlett-Packard Co.'s Laserjet Plus and Diablo Systems, Inc.'s 630. Typical duty cycle of 250,000 page/month. Includes 256 characters per font, prints 16 fonts per page and downloads additional fonts from host or floppy disk. Features dual 500-sheet feeders.

**Honeywell-Bull, Inc.**
**(800) 328-5111**
**4180D**
A duplex printer with Honeywell-Bull DPS 6/70 controller and multiple Motorola, Inc. 68020-based microprocessors. Prints at 180 (duplex) or 90 page/min (simplex) with a resolution of 240 dot/in. Includes an Ethernet interface, electronic forms and fonts and optional image processing.

**Page Processing System III**
Printer controller is a Honeywell-Bull DPS-6 minicomputer. Offers printing speed of 90 page/min and resolution of 240 dot/in. Includes loadable fonts.

**Miltope Business Products, Inc.**
**(516) 756-7650**
**Model 3802**
A channel-attached printer with a Delphax Systems, Inc. S-6000 engine. Prints at 90 page/min, with a duty cycle of 1 million page/month. Resolution of 240 dot/in., with two hard and two soft fonts and up to two resident macros.

**Series 75**
A channel-attached printer with Delphax S-6000 engine. Offers 75 page/min with a duty cycle of 1 million page/month. Includes 240 dot/in. resolution. Maximum input capacity of 1,500 sheets.

**Series 37**
A channel-attached or Dataproducts Corp. I/O printer with Delphax S-3000 engine. Offers 37 page/min, 300 dot/in. resolution and 250,000 page/month duty cycle. Hewlett-Packard Co. Laserjet emulation. Up to 16M bytes of on-board memory.

**Series 30M**
Delphax S-3000 engine-driven printer for communication channel applications or Dataproducts I/O. Offers 30 page/min and HP Laserjet, HP-GL and HASP emulation. Standard 1,000 sheet input capacity with

*Continued on page S12*

# Laser printers: 10 page/min and up

| COMPANY | PRODUCT | ENGINE | PRINT SPEED (PAGE/MIN) | DUTY CYCLE (PAGE/MONTH) | ON-BOARD MEMORY | RESOLUTION (DOT/IN.) | EMULATIONS | PAGE DESCRIPTION LANGUAGES SUPPORTED | NUMBER OF FONTS AVAILABLE (HARD/SOFT) | NUMBER OF FONTS PER PAGE | MAXIMUM INPUT SHEET CAPACITY | COLLATING CAPABILITY | HANDLES ENVELOPES/LABELS | MOST TYPICAL USE | PRICE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Acom Computer, Inc. (800) 346-3638** | LX3845+ | CIE 3040 S | 45 | 250,000 | NP | 300 x 300 | IBM 5219 | None | 8/32 | 32 | 2,500 | Yes | No | High-volume DP | $26,495 |
| | LX3830+ | CIE 3000 S | 30 | 150,000 | NP | 300 x 300 | IBM 5219 | None | 8/32 | 32 | 2,500 | Yes | No | High-volume DP from IBM System/34, 36, 38 | $18,495 |
| | LX3820 | Canon LBP-20 | 20 | 70,000 | 1.5M | 300 x 300 | IBM 5219, HP Laserjet Plus | None | 34/25+ | NP | 2,500 | Yes | No | High-volume word processing | $28,495 |
| | LX3815 | Ricoh LP4150 | 15 | 20,000 | 1.5M | 300 x 300 | IBM 5219, HP Laserjet Plus | None | 11/25+ | 28 | 500 | Yes | Labels | IBM System/34, 36, 38 word processing, DP | $6,995 |
| | LX5212E | Toshiba Page Laser 12 | 12 | 25,000 | 512K | 300 x 300 | IBM 5219, HP Laserjet Plus, Diablo 630 | None | 12/25+ | NP | 750 | Yes | Both | Envelope printing from IBM System/34, 36, 38 | $5,995 |
| **Advanced Technologies International, Inc. (408) 748-1688** | 2670 with DW-2 | Dataproducts 2600 | 26 | 60,000 | 768K | 300 x 300 | Diablo 630, Qume Sprint II, NEC Spinwriter, Epson FX/MX-30, HP Laserjet, ANSI 3.64, DEC LNO1 | Laserdrive | 12/ Unlmt. | Unlmt. | 500 | Yes | Labels | Office automation | $17,995 |
| | 2670 with DW-3 | Dataproducts 2600 | 25 | 60,000 | 2M | 300 x 300 | Diablo 630, Epson FX/MX-80, HP Laserjet Plus, HP-GL 7470/7475A plotter, Tektronix 4014 | Laserdrive | 18/ Unlmt. | Unlmt. | 500 | Yes | Labels | Office automation | $17,995 |
| | 2670 with GR-2 | Dataproducts 2600 | 26 | 60,000 | 2M | 300 x 300 | Versatec V-80 | None | None | None | 500 | No | Labels | CAD/CAM[1] | $17,995 |
| | 1570 with DW-2 | Ricoh LP4150 | 15 | 15,000 | 768K | 300 x 300 | Diablo 630, Qume Sprint II, NEC Spinwriter, Epson FX/MX-80, HP Laserjet, ANSI X3.64, DEC LNO1 | Laserdrive | 12/ Unlmt. | Unlmt. | 500 | Yes | NP | Office automation | $7,495 |
| | 1570 with DW-3 | Ricoh LP4150 | 15 | 15,000 | 2M | 300 x 300 | Diablo 630, Epson FX/MX-80, HP Laserjet Plus, HP-GL 7470/7475A plotter, Tektronix 4014 | Laserdrive | 18/ Unlmt. | Unlmt. | 500 | Yes | NP | Office automation | $7,495 |
| **AT&T (800)247-1212** | 495 Laser Printer | Genicom | 10 | 5,000 | 512K | 300 x 300 | HP Laserjet, Qume Sprint II, IBM Graphics Printer | None | 3/4 | 7 | 200 | Yes | Labels | Office automation | $2,995 |
| **BGL Technology Corp. (805) 987-7305** | Mark Series | Data products LZR 1200 or 2600 | 12, 20 or 26 | 10,000 or 40,000 | 2.5M-5M | 300 x 300 | HP-GL, HP Laserjet, Tektronix 4010, 4014, Versatec, Diablo 630, DEC LNO3 | Riprint | 8/97 | Unlmt. | 2,000 | Yes | Both | High-speed graphics output | $6,495-$15,495 |
| **Citizen America Corp. (213) 453-0614** | Overture 110 Laser Printer | Mita | 10 | 5,000+ | 512K | 300 x 300 or 240 x 216 | Epson FX-286, IBM Proprinter, Diablo 635 | None | 6/1 | 16 | 300 | Yes | Both | Office automation | $1,995 |
| **C. Itoh Electronics, Inc. (714) 660-1421** | LIPS 10 Plus | Konica | 10 | 15,000 | 512K | 300 x 300 | HP Laserjet Plus, Laserjet; Diablo 630; Epson FX-80 | None | 8/12 | 16 | 250 | Yes | Labels | Office automation | $3,295-$4,495 |
| **CPT Corp. (612) 937-8000** | LP-15 | Ricoh LP4150 | 15 | 15,000-25,000 | 2.5M | 300 x 300 | HP Laserjet Plus, Epson, Diablo, Qume | ANSI X3.64 | 27/0 | 27 | 250 | Yes | No | Shared office automation | $8,000 |
| **Data General Corp. (617) 366-8911** | 6479 | Toshiba A740 | 26 | 80,000 | 0.5M | 300 x 300 | Diablo 630 | None | 6/0 | Unlmt. | 2,000 | Yes | No | Heavy-duty text applications | $15,855 |
| | 6475 Tabletop Laser | Toshiba A739 | 12 | 10,000 | 2M | 300 x 300 | HP Laserjet Plus, Diablo 630, Epson FX-80 | None | 6/0 | Unlmt. | 850 | No | Envelope | Time-sensitive documents, high-volume mailings | $4,195 |
| | 6474 Tabletop Laser | Toshiba A739 | 12 | 10,000 | 0.5M | 300 x 300 | HP Laserjet, Diablo 630, Epson FX-80 | None | 6/0 | Unlmt. | 850 | No | Envelope | Time-sensitive documents, high-volume mailings | $3,695 |
| **Dataproducts Corp. (818) 887-8000** | 2610 | Toshiba A740 | 26 | 100,000 | 64K | 300 x 300 | Dataproducts B series | None | 8/0 | 1 | 2,000 | Yes | Labels | Electronic DP | $13,500 |
| | 2620 | Toshiba A740 | 26 | 100,000 | 1.5M | 300 x 300 | Tektronix 4010, Dataproducts B series | None | 8/0 | 8 | 2,000 | Yes | Labels | Bar code label applications | $14,550 |
| | 2630 | Toshiba A740 | 26 | 100,000 | 32K | 300 x 300 | Diablo 630 | None | 64/0 | Unlmt. | 2,000 | Yes | Labels | Office automation | $15,600 |
| | 2655 | Toshiba A740 | 26 | 100,000 | 3M | 300 x 300 | Diablo 630, Tektronix 4010 | Riprint | 3/ Unlmt. | Unlmt. | 2,000 | Yes | Labels | Technical document publishing | $20,800 |
| | 2665 | Toshiba A740 | 26 | 100,000 | 2.5M | 300 x 300 | NA | Postscript | 13/3 | Unlmt. | 2,000 | Yes | Labels | Desktop publishing | $18,700 |
| | 1230 | Toshiba A739 | 12 | 25,000 | 512K | 300 x 300 | HP Laserjet Plus, Diablo 630, Epson FX-80 | None | 12/ Unlmt. | Varies by emulation | 750 | No | Both | Office automation | $3,695 |
| | 1260 | Toshiba A739 | 12 | 25,000 | 4M | 300 x 300 | HP Laserjet Plus | Postscript | 35/ Unlmt. | Unlmt. | 750 | No | Both | Desktop publishing | $7,995 |
| **Data Systems Hardware (703) 478-0800** | VX018 | Proprietary | 12 | 25,000 | 512K | 300 x 300 | HP Laserjet Plus, Epson FX-80, Diablo 630 ESC, DEC LNO3 | Postscript proprietary | 16/50 | Unlmt. | 750 | No | Both | Shared office automation | $3,695 |
| | VX016 | Olympus P30/45 | 30-45 | 150,000 | 4M or 6M | 300 x 300 | HP Laserjet, Diablo 630, DEC LNO3 Plus, line printer | Postscript clone | 32/100 | 32 | 2,000 | Yes | Labels | Office automation | $16,000-$25,000 |
| **Data Terminal Mart Ltd. (416) 677-0184** | DTM Lettermate III | Hitachi R10 | 10 | 5,000 | 512K | 300 x 300 | DEC LQP03 | None | 16/24 | 256 | 250 | Yes | Labels | DEC word processing | $3,290 |
| **Decision Data Computer Corp. (215) 674-3300** | 6415 | Ricoh LP4150 | 15 | 25,000 | 1M | 300 x 300 | IBM 5219, 3812, 5224, 5225, 5256, 4214 | None | 8/14 | Unlmt. | 500 | No | Labels | Letter-quality printing | $7,995 |
| **Derex, Inc. (800) 245-7282** | DRL 10 | Kyocera F2000 | 10 | 5,000 | 512K | 300 x 300 | HP Laserjet Plus, Diablo 630, Qume Sprint II, NEC Spinwriter, IBM Graphics Printer, Epson FX-80 | Postscript available 3rd quarter | 82/ 100+ | 32 | 250 | Yes | Both | Desktop publishing | $2,895 |
| | DRL 10+ | Kyocera F2000 | 10 | 5000 | 1.5M | 300 x 300 | HP Laserjet Plus, Diablo 630, Qume Sprint II, NEC Spinwriter, IBM Graphics Printer, Epson FX-80 | Postscript available 3rd quarter | 82/ 100+ | 32 | 500 | Yes | Both | Office automation | $4,695 |
| | DRL 20 | Kyocera F2000 | 18 | 15,000 | 1.5M | 300 x 300 | HP Laserjet Plus, Diablo 630, Qume Sprint II, NEC Spinwriter, IBM Graphics Printer, Epson FX-80 | Postscript available 3rd quarter | 82/ 100+ | 32 | 500 | Yes | Both | Office automation | $8,395 |

[1]Computer-aided design and manufacturing [2]Forms generation language [3]Intelligent printer data stream [4]Document description language [5]Printer control language [6]Advanced function printing [7]Page description language

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, this is designated NP (not provided). When a question does not apply to a vendor's product, this is designated NA (not applicable). Further product information is available from the vendors.

# Top sellers

FROM PAGE S8

an optional 250 sheets. Eight fonts per page.

**NBS Southern, Inc.**
**(813) 441-1981**
**Mercurion 1/80**
Prints at 80 page/min with 240 dot/in. resolution. Duty cycle of 500,000 page/month and local or remote operation. Comes standard with four resident fonts, 1M-byte memory. Features primary input capacity of 1,500 sheets and face-down output.

**Unisys Corp.**
**(215) 542-2504**
**B 9275**
Prints at 75 page/min with a resolution of 240 dot/in. Includes 10 resident and 26 downloadable fonts. Offers input capacity of 1,500 pages and face-down printing.

**Xerox Corp.**
**(800) 832-6979**
**Xerox 4075 Printing System**
Entry-level system for medium-size and large data processing departments. Prints up to 75 page/min with 240 dot/in. resolution. Has monthly duty cycle from 100,000 to 1 million page/month.

## Electrophotography: LED printers

**IBM**
**Contact local sales office**
**3812**
Prints at 12 page/min with 240 dot/in. resolution. Features 18,000 page/month duty cycle, 1M-byte memory and 550-page primary input capacity. Offers IBM 5219, 5152 and 3287 emulation.

**Kentek Information Systems, Inc.**
**(201) 825-8500**
**K-2+**
Produces 300 dot/in. output at 15 page/min. Duty cycle of 40,000 page/month. Offers Hewlett-Packard Co. Laserjet Plus, Diablo Systems, Inc. 630 and Tektronix, Inc. Plot 10 emulations.

**K-3**
Produces 300 dot/in. output at 24 page/min. Duty cycle is 80,000 page/month. Optional Adobe Systems, Inc. Postscript-compatible page description language (PDL) interpreter.

**K-4**
Duplex printer produces 300 dot/in. text and graphics at 24 sides per minute. Optional Postscript-compatible PDL interpreter.

**NEC Information Systems, Inc.**
**(617) 264-8000**
**LC 850**
Prints 8 page/min with a resolution of 300 dot/in. Emulations include NEC Spinwriter 3550 and IBM Proprinter. Offers four resident fonts; an unlimited number can be downloaded. Duty cycle is 5,000 page/month. Includes 250-sheet input capacity.

**LC 860 Plus**
Prints at 8 page/min with resolution of 300 dot/in. Emulations include Hewlett-Packard Co. Laserjet Plus, HP 7475A, NEC Spinwriter 3550 and IBM Proprinter. Offers four resident fonts; an unlimited number can be downloaded. Duty cycle is 5,000 page/month. Includes 500-sheet input capacity.

**LC 890**
Prints at 8 page/min with resolution of 300 dot/in. Emulations include Adobe Systems, Inc. Postscript, HP Laserjet Plus and Diablo Systems, Inc. 630. Includes 35 resident fonts, and an unlimited number can be downloaded. Duty cycle is 5,000 page/month. Includes 500-sheet input capacity.

## Electrophotography: Liquid crystal shutter printers

**Data Technology Corp.**
**(408) 727-8899**
**Crystalprint VIII**
An 8 page/min printer with Hewlett-Packard Co. Laserjet Plus emulation and 300 dot/in. resolution. Includes read-only memory-resident and cartridge-based fonts and downloadable font and forms capability. Cartridge-based command and font emulations include Epson America, Inc. FX-85, Diablo Systems, Inc. 630, Hewlett-Packard Co. HP-GL 7475A and IBM Proprinter.

**Taxan USA Corp.**
**(818) 810-1291**
**Crystal Jet**
Prints at 8 page/min with 300 dot/in. resolution. Offers a 10,000 page/month duty cycle and 2M-byte memory. Hewlett-Packard Co. Laserjet Plus, IBM Graphics Printer, Qume, Inc. Sprint 5, NEC Information Systems, Inc. 5510 and 3550, Diablo Systems, Inc. 630 and Epson America, Inc. MX-80 emulation.

Information supplied by CAP International, Inc.



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- 90. Computer/Peripheral Dealer/Distributor/Retailer
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- 19. Vice President, Asst VP
- 21. Dir., Mgr., Suprv., IS/MIS/DP Services
- 22. Dir., Mgr., Suprv., of Operations, Planning, Adm. Services
- 23. Dir., Mgr., Suprv., Analyst, of Systems
- 31. Dir., Mgr., Suprv., of Programming
- 32. Programmer, Methods Analyst
- 35. Dir., Mgr., Suprv., OA/WP
- 38. Data Comm Network/Systems Mgt

OTHER COMPANY MANAGEMENT
- 11. President, Owner/Partner, General Mgr
- 12. Vice President/Asst VP
- 13. Treasurer, Controller, Financial Officer
- 41. Engineering, Scientific, R&D, Tech Mgt.
- 51. Sales/Mktg Mgt

OTHER PROFESSIONALS
- 80. Consulting Mgt
- 70. Medical, Legal, Accounting Mgt
- 80. Educators, Journalists, Librarians, Students
- 90. Others _____ (Please specify)

3 COMPUTER INVOLVEMENT (Check all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant
- A. Mainframes/Superminis
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- 31. Dir., Mgr., Suprv., of Programming
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- 90. Others _____ (Please specify)

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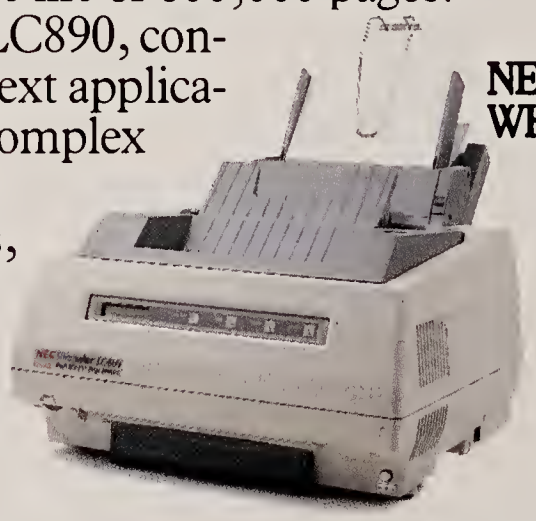
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EDITOR'S CHOICE
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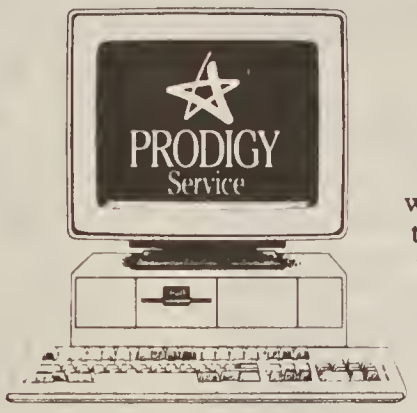
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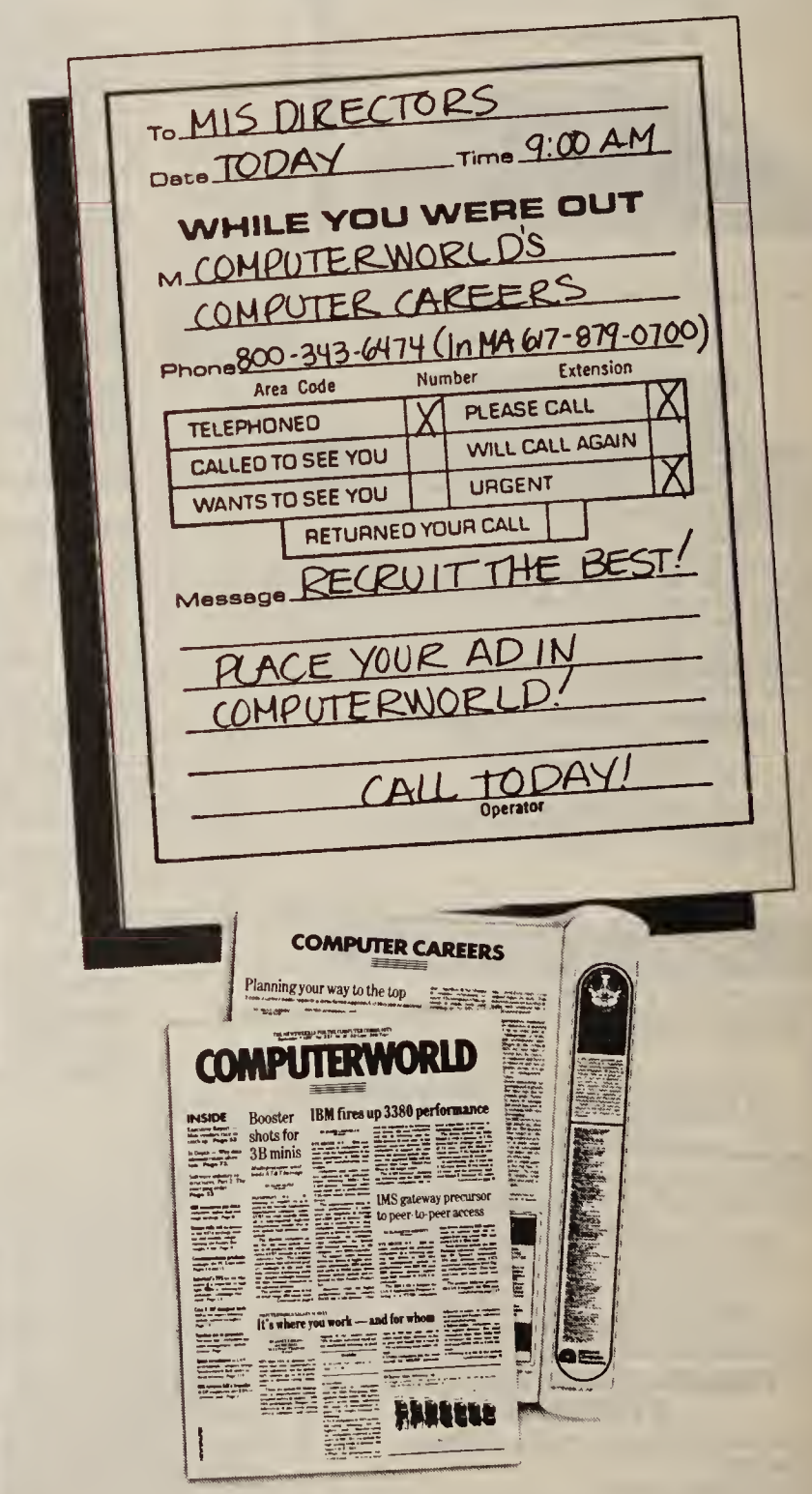
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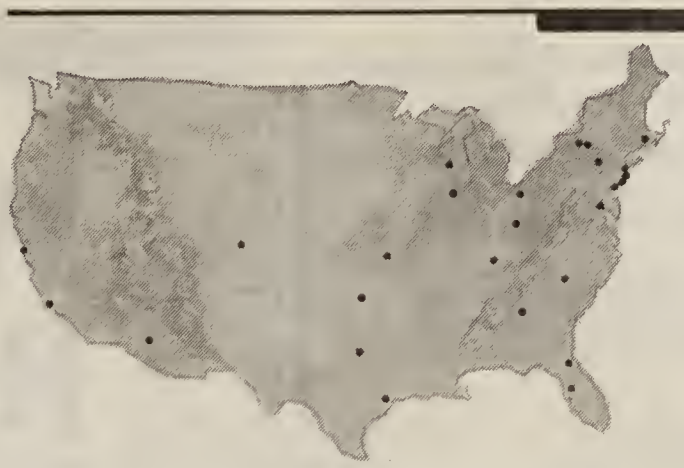
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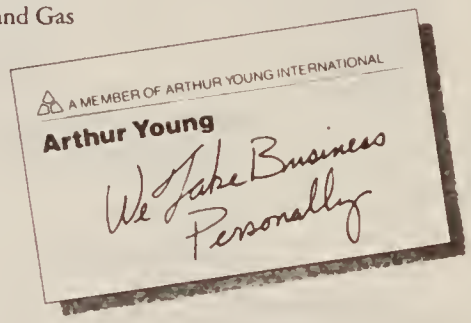
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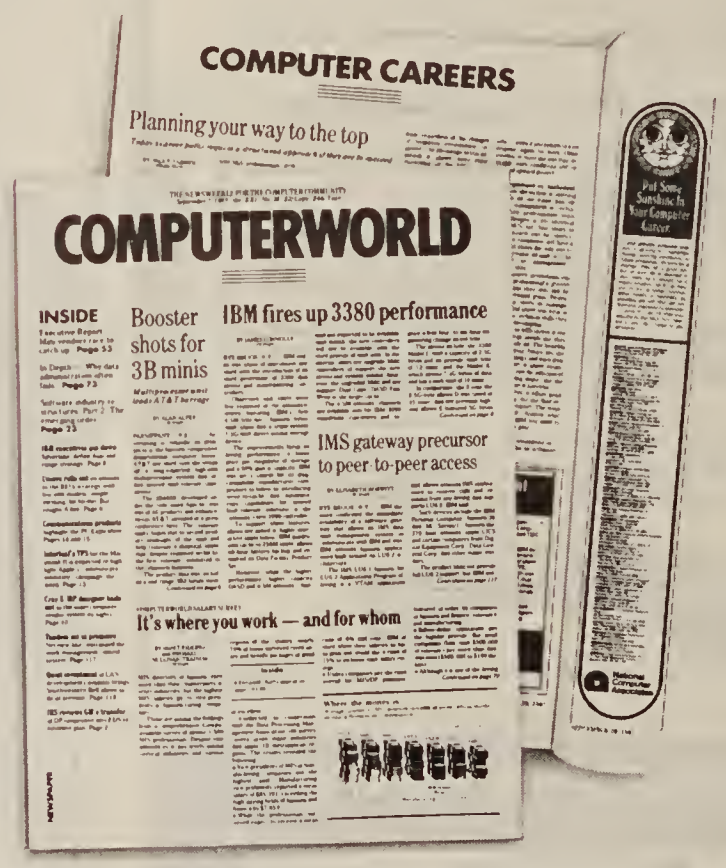
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**Computer Professionals: Some people were created to solve problems.**

Let's examine the rather singular Case of the Reluctant Relocator, who came to our digs with his problem. Our NCA consultant immediately deduced, from the grim visage and slumped shoulders, that our visitor was unhappy with his present circumstances. After a thorough interrogation and by applying the three-pipe method of analysis our consultant proffered a solution... relocation! Our visitor agreed, rather reluctantly at first, until he learned that our NCA network, with offices in most major cities, could find him the position he wanted, where he wanted to live... before he moved...and at no cost to him for interview and relocation expenses.

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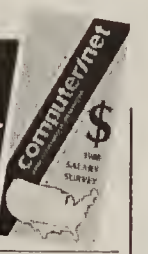
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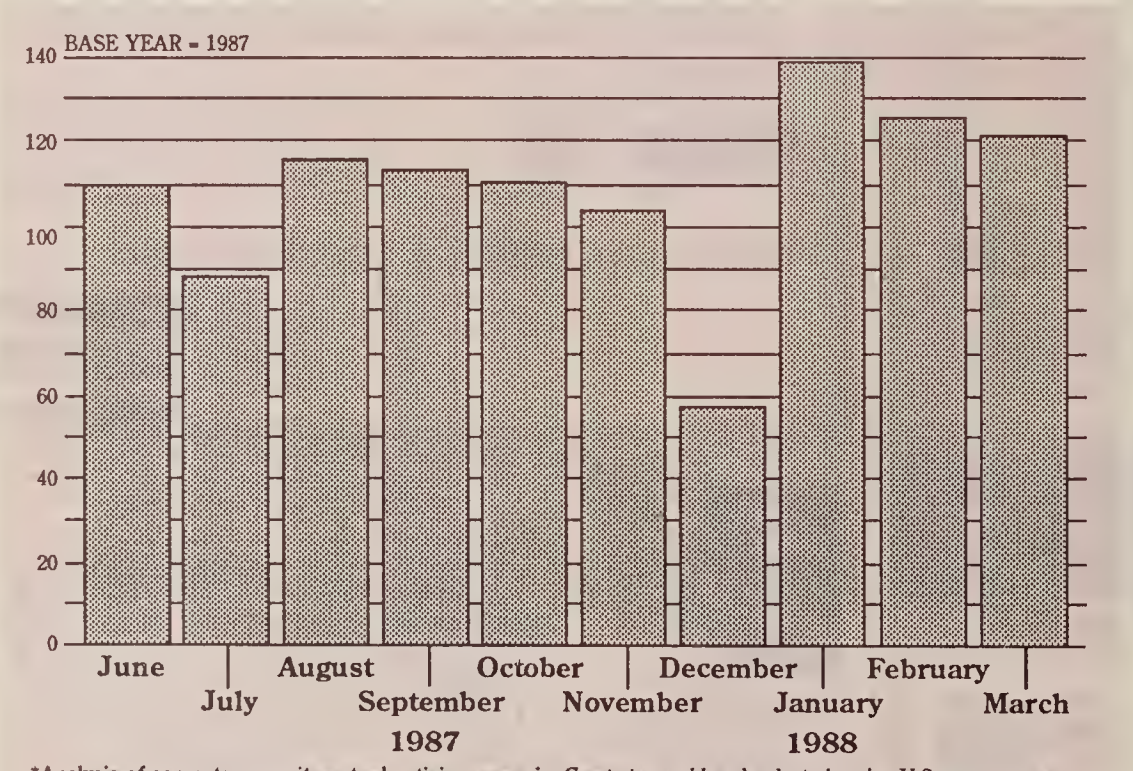



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# CAREER INDEX

## Computer recruitment advertising index*




*Analysis of computer recruitment advertising space in *Computerworld* and selected major U.S. newspapers

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PROGRAMMER

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5 Years of systems programming, in the IBM MVS/XA environment. Document composition programming skills a plus. Excellent verbal communication skills and the ability to project a professional presence.

## CANDIDATE PROFILE

Fill out the profile below which indicates the confidence you have in yourself, based on your knowledge and experience. The following are self rating questions. Circle each question and attach to your resume.

| | None | Limited | | Working | | | | Skilled | | |
|---|---|---|---|---|---|---|---|---|---|---|
| MVS/XA | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 10 |
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| MVS Sys Gens/IOCP | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 10 |
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| 3800/3820 Printers | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 10 |
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# No end in sight to RAM craze

*Large-volume and small users sell chips in light of price pressures*

BY CAMERON HALL
BOSTON COMPUTER EXCHANGE CORP.

"The chips are down, and their price is high" was the cry of the market-wise callers who had valuable reserves of dynamic random-access memory to sell last week.

For buyers in the RAM market, spot prices were up. Everyone is scrambling to buy, and there seems to be no end to current price pressures on the horizon. Buyers had to pony up and pay full fare for memory in a market that has been tight for weeks and that market traders say is getting even tighter.

The Boston Computer Exchange usually sees only large-volume traders in the chip market, but last week saw the news of a tight chip market filtering down to the end-user level, with individuals calling to offer their old RAM upgrade boards. One astute seller of chips said, "I never believed I'd be taking old 64K RAM chips off my boards to help fight the dynamic RAM war with the Japanese."

Callers from IBM warmed the wires last week as they called to verify that one of their own was looking for Personal Computer AT Model 339s. No one at IBM seems to have gotten the word that the best seller of the DOS era is a great seller in the Personal System/2 era.

Meanwhile, the market for IBM PC ATs sizzled; and brokers and buyers around the country quickly grabbed all available machines. The 20-MHz AT had upward price pressure during the week but finished off at the previous week's close of $2,350. Good news of a plentiful supply of AT Models 239 and 339 resulted in descending prices, with a price drop of $100 to $3,550 for the Model 339.

### Rumor mills turning

In the wake of rumors from IBM of low-priced PS/2 models, IBM sellers were calling to list early models for sale. They were concerned that a drop in resale value of early IBM equipment would occur when these early models are competing with the rumored Intel Corp. 80286-based PS/2 for $1,100 and an Intel 80386 machine for $1,500.

The loser of the week, in the wake of the PS/2 price drop rumor, was the PS/2 Model 50, which was off $175 to $2,300. At the same time, the PS/2 Model 80 closed at a stable $5,800.

Eagerness to sell resulted in some PC XT bargains for buyers, with the most actively traded machine being the 10-MHz XT Model 086, which closed at $1,185, down $40 from the previous week's close. The market also saw good activity for PCs, which closed April 29 at $800, down $25 from the previous week. The IBM 20-MHz PC XTs remained at April 22's lower close.

The most heavily traded machine in the Compaq Computer Corp. market was the Compaq Portable I. It remains the toaster of the computer industry because of its compactness. The Portable I traded at $800 and the Compaq Plus at $1,125 in volume, down $25 and $50, respectively, under pressure from lighter weight laptops that offer the same capabilities with greater storage on 3½-in. drives. The Compaq Portable II, III and 286 sold in the previous week's range, as did the quietly traded Deskpro models.

The Apple Computer, Inc. Macintosh market picked up, and buyers moved back into it as they felt the price drops of the recent weeks had ended. During the week ended April 29, four of the seven Macintosh models showed price gains (see chart at right).

Macintosh II buyers were looking for machines as word of the Mac II's superior performance spread. Prices for the machine were bid up to $4,325 and closed up $75 over the previous week. Latest model Mac SE and early Macintosh 512 and 512E models were also up. The Mac Plus models and the Mac SE held steady as traders settled for mid-April prices.

The Boston Computer Exchange can be reached at 800-BOCOEXX or 617-542-4414 in Massachusetts.

## The BoCoEx Index

*Closing prices report for the week ending April 29, 1988*

| | Closing price | Recent high | Recent low |
|---|---|---|---|
| **IBM PC Model 076** | $800 | $900 | $500 |
| **XT Model 086** | $1,185 | $1,350 | $925 |
| **XT Model 089** | $1,650 | $1,750 | $1,175 |
| **AT Model 099** | $2,350 | $2,425 | $1,875 |
| **AT Model 239** | $2,600 | $2,650 | $2,150 |
| **AT Model 339** | $3,550 | $3,700 | $2,750 |
| **PS/2 Model 50** | $2,300 | $2,475 | $2,275 |
| **PS/2 Model 80** | $5,800 | $6,100 | $5,475 |
| **Compaq Portable I** | $800 | $900 | $575 |
| **Portable II** | $2,100 | $2,150 | $1,600 |
| **Portable III** | $3,200 | $3,250 | $2,700 |
| **Portable 286** | $2,150 | $2,250 | $1,675 |
| **Plus** | $1,125 | $1,175 | $775 |
| **Deskpro 20-MHz** | $1,400 | $1,500 | $1,025 |
| **Deskpro 286** | $2,425 | $2,475 | $1,850 |
| **Deskpro 386** | $4,075 | $4,000 | $3,475 |
| **Apple Macintosh 512** | $750 | $800 | $575 |
| **512E** | $875 | $1,025 | $675 |
| **Plus** | $1,150 | $1,350 | $900 |
| **Plus 20-MHz** | $1,750 | $1,800 | $1,550 |
| **SE** | $1,925 | $2,200 | $1,600 |
| **SE 20-MHz** | $2,400 | $2,400 | $2,100 |
| **II** | $3,975 | $4,325 | $3,500 |
| **Apple Laserwriter Plus** | $3,100 | $3,500 | $2,500 |
| **HP Laserjet Series 2** | $1,400 | $1,425 | $1,375 |
| **NEC Multispeed EL** | $950 | $950 | $700 |

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

# Market forces rule IBM printer supply, demand

BY NANCY DIPALMA
IDC FINANCIAL SERVICES CORP.

IBM has announced a limited-offer price reduction for the IBM 3800 Model 1 to 3800 Model 3 upgrade. Orders for this offer must be placed with IBM between April 19 and Oct. 21 and must be installed by Dec. 31, 1988. The new upgrade cost is $62,500, reduced from $95,000. As of Oct. 22, 1988, this offer will be withdrawn.

This limited offer has caused a drop in the used value of the 3800 Model 1. Since end users are primarily interested in the 3800 Model 3, dealers that have acquired Model 1s have been upgrading and remarketing them as Model 3s. By eliminating the upgrade, there will be no demand for the Model 1, causing further declines.

Secondary market activity for the 3800 Model 3 printer has slowed down recently. This lack of used trading is partially the result of the saturation of the high-end laser printer market and end users' anticipation of a replacement product, which IDC Financial Services Corp. expects by the first half of 1989.

There have been no reports of the IBM 3800 Model 6 trading on the secondary market, and interest in this printer is very limited. Many users are still waiting for IBM to make the upgrade from a 3800 Model 6 to a 3800 Model 3 available. This upgrade path was promised by IBM when it announced the 3800 Model 6 in January 1987.

The IBM 3287 Models 1 and 2, which leveled off during fourth-quarter 1987, have once again begun to decline on the used market.

Used values for the 3287 Models 1 and 2 have fallen approximately 18% in the retail market since the beginning of this year. Essentially, supply outstrips whatever remaining demand there is for these printers.

### It's black and white

Sources indicate that very few users are interested in the color capabilities offered by the IBM 3287 Models C1 and C2 because of the extra cost and print quality associated with these printers. Thus, these printers are not very popular on the secondary market.

The secondary market for the IBM 3268 Models 2 and C2 serial matrix printers has begun to stabilize after a huge decline in value — more than 50% — during 1987. Reports from secondary market sources indicate that activity has slowed and values remain constant in the 3268 area.

The IBM 4245 Model 12 engraved-band printer recently experienced a decline in used value. This decline is the result of a combination of three different market forces:

- The announcement of IBM's 6262 band printer family.
- The ample supply of 4245 Model 12s on the used market.
- Users' migration to higher speed printers.

Currently, demand for the IBM 4245 Model 20 is strong, as there are limited numbers of these printers available on the used market and, as a result, used values are holding steady. This stable market value may be attributed to the Model 20's attractive price/performance.

The IBM 3262 used market has been uneventful recently. This printer family has been experiencing normal market declines as a result of end users moving out of the 3262 printer family and into higher speed band printers.

For more information, contact IDC Financial Services' Terri LeBlanc at 617-872-8200.

## IBM printers

| | IBM list price | Print speed | Current retail percent of list price |
|---|---|---|---|
| 3800 Model 3 | $289,000 | 215 page/min | 57% |
| 3287 Model 2 | $3,580 | 120 char./sec. | 18% |
| 3268 Model 2 | $5,900 | 340 char./sec. | 31% |
| 4245 Model 12 | $31,000 | 1,200 line/min | 67% |
| 4245 Model 20 | $35,000 | 2,000 line/min | 77% |
| 3262 Model 3 | $15,040 | 650 line/min | 43% |

INFORMATION PROVIDED BY IDC FINANCIAL SERVICES CORP.
CW CHART

# Used Equipment

**LEGAL NOTICE**

**UNITED STATES BANKRUPTCY COURT**
**SOUTHERN DISTRICT OF NEW YORK**

***In re: CHARLES GREENBERG & SONS, INC., Debtor.***
***CHAPTER 11 CASE No. 87B12507 (TLB)***

**NOTICE OF HEARING TO CONSIDER SALE OR IBM COMPUTER SUBJECT TO HIGHER AND BETTER OFFERS**

NOTICE IS HEREBY GIVEN, that a hearing will be held before the Honorable Tina L. Brozman, United States Bankruptcy Judge, in Room 621-1 of the United States Customs House, One Bowling Green, 6th Floor, New York, New York on the 17th day of May, 1988, at 11:00 a.m. or as soon thereafter as counsel may be heard, at which time and place the Court will consider the application of the above-captioned Debtors (the "Application") for an order authorizing and empowering the Debtor to sell, transfer and convay of its right, title and interest in an IBM System 38 Central Processing Unit and related computer softwara and hardware located at 1250 Broadway, New York, New York and in Georgia (the "IBM Computer") to COMPUTER GENERATED SOLUTIONS, INC. ("CGS") in consideration of $68,226.80 including non-cash consideration in services valued by CGS at $38,226.80, upon the terms and conditions of an offer annexed to the Application (the "Offer"), or such higher and better offer as may be made at the hearing scheduled herein (the "Proposed Sale"), free and clear of all liens, claims, encumbrances, security interests, and other charges, if any, with any such liens, claims, encumbrances, security interests, and other charges to attach to the proceeds of such sale, upon the terms and conditions set forth in the Offer, subject to higher or better offers, which may be received at the hearing; **provided, however,** that such high bid to purchase the IBM Computer is greater than $68,226.80, including non-cash consideration in services valued by CGS at $38,226.80, net, twenty five percent (25%) thereof (a non-refundable deposit) to be paid to Greenberg by certified check by not later than the close of business on the day following such hearing and the balance payable by cash, certified or official bank check to the order of Greenberg at the closing of title, and shall be in accordance with the procedures set forth herein and substantially on the same terms and conditions set forth in the Offer, and upon such other terms and conditions as may ultimately be determined herein. The failure by the successful bidder to maka the aforesaid deposit or to close and take title to the premises within fiva (5) business days after the entry of an Order by the Court approving the sale becomes final in all respects shall be deemed a default. In the event of a default, the aforesaid deposit shall constituta liquidated damages, and the Debtor shall then have the right to offer the IBM Computer for sale to the next highest bidder upon the terms herein. Unless extended by the mutual consent of the debtor and successful bidder, transfer of the IBM Computer and payment of the balance of the consideration therefora shall occur at a closing to be held at the officers of Debtors' counsel on the fifth business day after the order of the Court approving the sale becomes final in all respects.

**DESCRIPTION OF IBM COMPUTER**

**System 38 Central Processing Unit, and related software and hardware including disk drives, tape drive, modems, printers, peripherals, and one IBM Personal Computer with a 5251 emulation board.**

PLEASE TAKE FURTHER NOITICE, that said hearing will be held pursuant to s Notice of Proposed Order dated April 27, 1988, which notice is based upon the Application. A copy of said Notice, Proposed Order, Application and the exhibits annexed thereto are on file with the Clerk of the U.S. Bankruptcy Court, United States Customs House, One Bowling Green, 5th Floor, New York, New York 10004 and at the offices of counsel for the Debtors herein, and may be axamined by any interested party at any time during regular business hours.

PLEASE TAKE FURTHER NOTICE, that objections, if any, to the Proposed Sale shall be in writting and shall set forth in detail the basis of the object and the relationship of the objectant to the Debtor(s). Objections must be filed with the Bankruptcy Court at the address set forth above with a copy thereof served upon the undersigned counsel for the Debtors prior to May 12, 1988.

PLEASE TAKE FURTHER NOTICE, that the Debtors reserve the right to alter any and all terms and conditions of sale up to the conclusion of the hearing.

PLEASE TAKE FURTHER NOTICE, that the IBM Computer may only be inspected by appointment made with the Debtors.

PLEASE TAKE FURTHER NOTICE, that the IBM Computer is being sold "AS IS" and "WHERE IS" without any representation or warranty of any kind, except as may be expressly stated herein.

PLEASE TAKE FURTHER NOTICE, that the hearing described above may be adjourned from time to time without further notice to creditors or interested parties or dates at the said hearing.

PLEASE TAKE FURTHER NOTICE, that the Court shall retain jurisdiction to determine all matters arising out of or relating to the proposed transaction and all persons or entities by submitting a bid at the hearing shall be governed by the conditions set by the court herein, and such persons or entities shall, upon becoming an offeror at the hearing, subject himself or itself to the jurisdiction of the Court in reference to all matters arising out of their offer and the consummation thereof and all matters related thereto.

Dated: New York, New York
May 9, 1988

Yours, etc.
SHEA & GOULD
Attorneys for the Debtors
and Debtors-in-Possession
1251 Avenue of the Americas
New York, New York 10022-1193
Att: Glenn E. Siegel, Esq.
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**Request for Proposal No. 1353,** due Thursday, May 26, 1988 at 3:30 p.m. for the acquisition of twenty microcomputers and peripherals for ALLIED ENTERPRISES. Charge $10.00.

**Request for Proposal No. 1354,** due Friday, May 27, 1988 at 3:30 p.m. for the acquisition of peripheral upgrades to an axisting Taxas Instruments minicomputer at MATTY HERSEE HOSPITAL. No charge.

**Request for Proposal No. 1355,** due Tuesday, May 24, 1966 at 3:30 p.m. for the acquisition of an upgrade for a Sperry 5000/60 minicomputer system for the MISSISSIPPI LIBRARY COMMISSION. No charge.

**Request for Proposal No. 1356,** due Friday, May 20, 1988 at 3:30 p.m. for the acquisition of a disk upgrade for a Wang VS-100 minicomputer system for the MISSISSIPPI STATE DEPARTMENT OF HEALTH. No charge.

**Request for Proposal No. 1357,** due Thursday, May 26, 1988 at 3:30 p.m. for the acquisition of a departmental minicomputer with full SNA communications for the OFFICE OF THE CLERK OF THE MISSISSIPPI SUPREME COURT. No charge.

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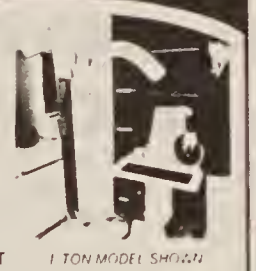
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## Training

# Micro vs. mainframe: pros and cons for CBT

BY DENA ALLMAN
SPECIAL TO CW

The forces of creativity and control are apt to clash in weighing the pros and cons of mainframe and microcomputer-based training (CBT) systems.

Sometimes accessibility will dictate the choice. "If you are training an audience who only has accessibility to a mainframe, use it," says Ron Munger, manager of computer-assisted instruction at Nationwide Insurance Co. in Columbus, Ohio.

When a choice is possible, however, the training department should always conduct an audience analysis to determine which CBT route to take.

Mainframe systems offer several advantages in the degree of control over program content and users that they provide.

The biggest one is the ease of changing the training program, according to Travis Piper, president of Creative Approaches, Inc., a vendor of mainframe and microcomputer-based CBT systems in East Bloomfield, N.Y. The instructor simply goes into the system to update it, while with micros, students must send in their disks to have them revised — a more time-consuming and expensive task.

According to Piper, other advantages of mainframe systems are greater ease in the following:

• Monitoring students. In some cases, students can also inform the trainer of problems by electronic message.

• Analyzing programs. The trainer simply calls up students' work, again avoiding the need to send in disks.

• Charging users. Microcomputer disks can be copied without payment.

• Detecting bugs. The mainframe can capture every keystroke, allowing the trainer to determine what is wrong with the training tools.

With a mainframe, scheduling training sessions might be easier, thereby avoiding backlogs, Piper says.

The hardware and software are in one place, while with microcomputers, the student, hardware and disks have to be brought together.

On the other hand, using a microcomputer system can be preferable from the creative standpoint, according to Nationwide's Munger. "It's a more powerful, flexible tool," he explains. "The capability to design lessons with all the bells and whistles are on the personal computer — not on the mainframe."

With microcomputers, Munger adds, there are more effective authoring tools than with the mainframe. "There are 100 good authoring tools available for the micro, and they all have their own features and characteristics." The mainframe, on the other hand, has only two or three "decent" authoring tools, Munger says.

Another advantage of microcomputer-based training is its audio and video capability, according to Gloria Gery, an independent consultant based in East Otis, Mass. and author of *Making CBT Happen*. "If people want to use interactive video, there's only one option — the PC," Gery says.

---

Allman is a free-lance writer based in Chicago.

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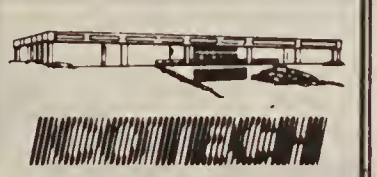
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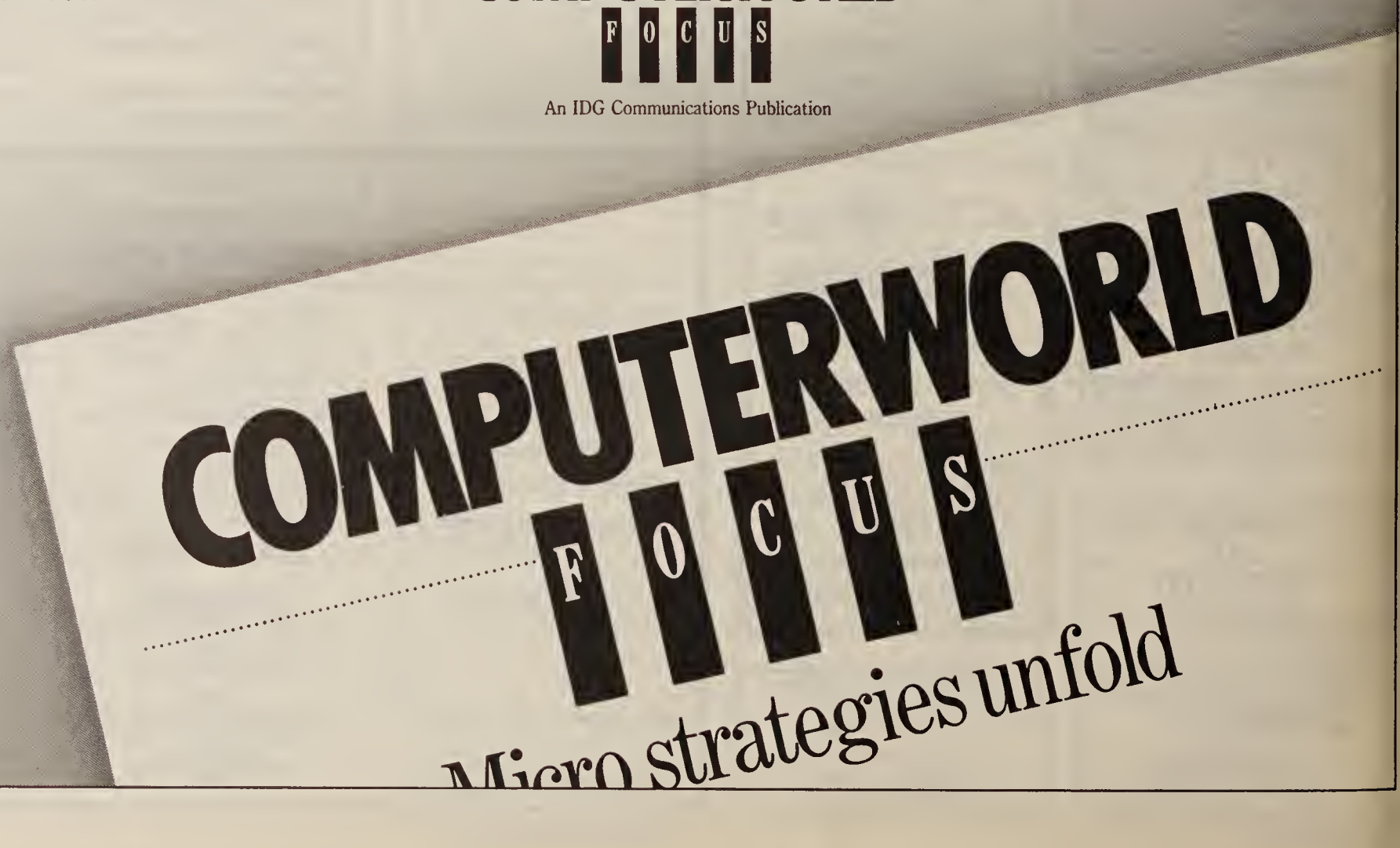
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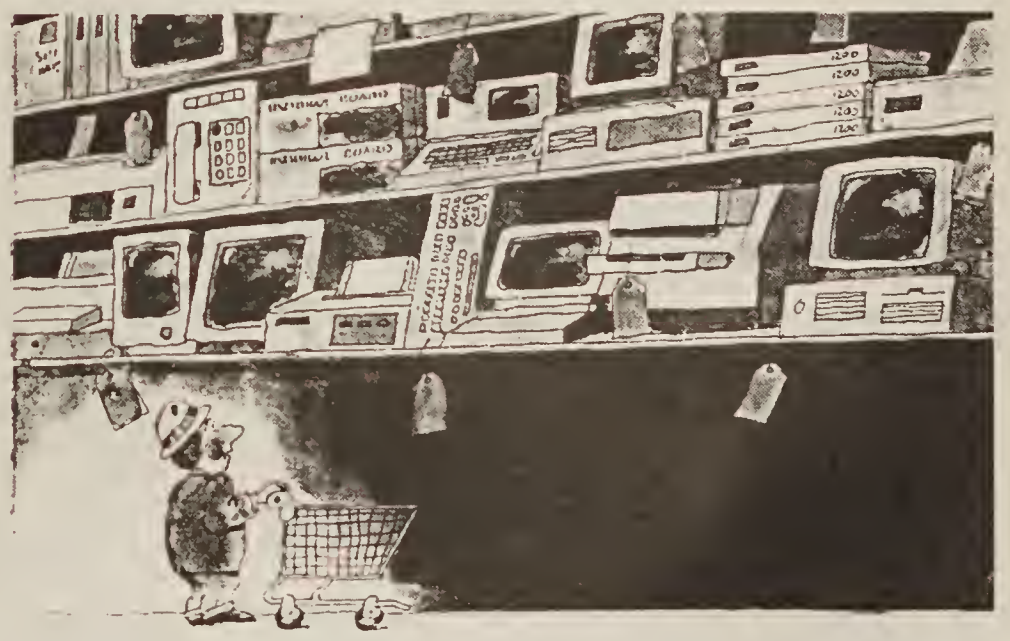
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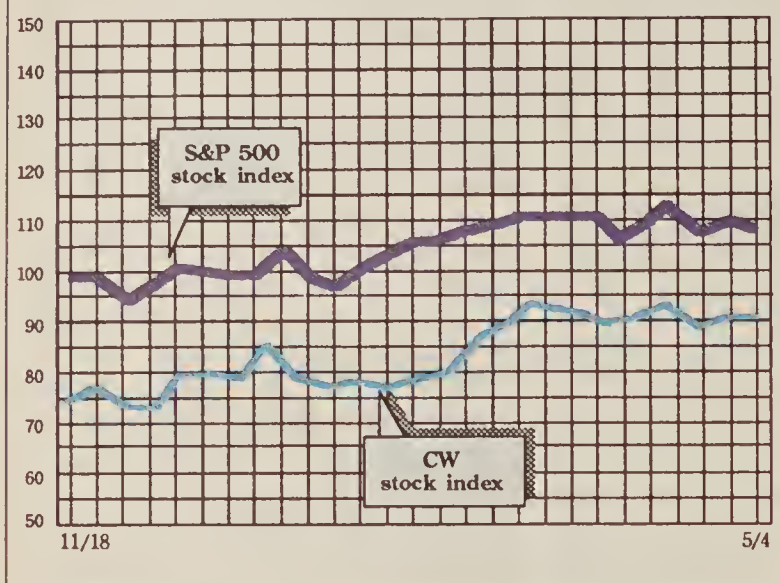

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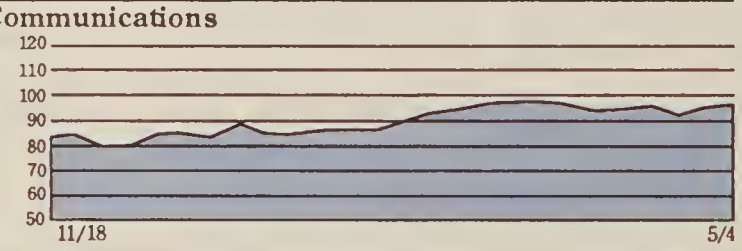
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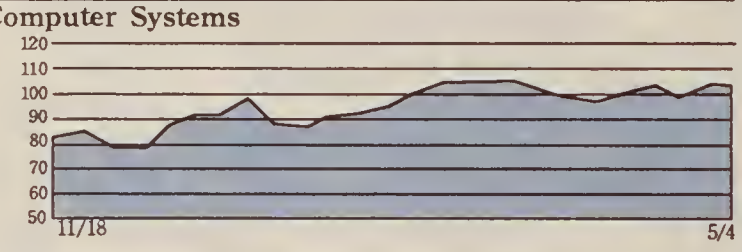



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| Peripherals & Subsystems | 90.7 | **88.1** |
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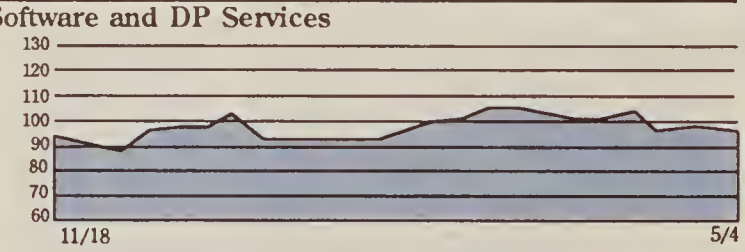
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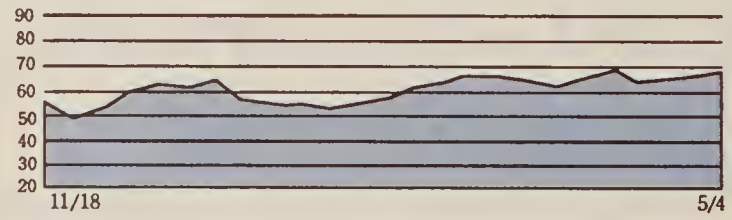

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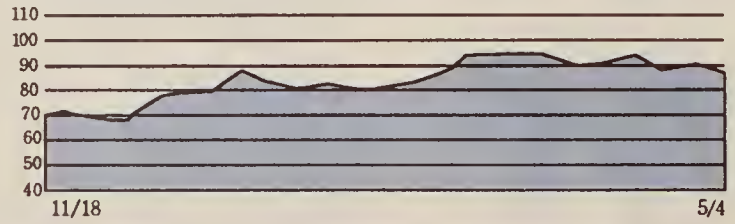

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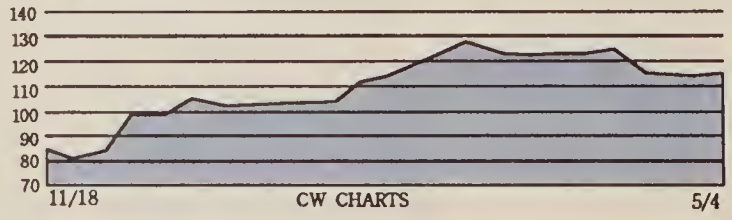

Semiconductors




Peripherals and Subsystems




Leasing Companies




# Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MAY 4, 1988

| EXCH | | 52-WEEK RANGE (1) | | CLOSE MAY 4 1988 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|---|
| | **Communications and Network Services** | | | | | |
| N | AMERICAN INFO TECHS CORP | 100 | 74 | 86.63 | -2.9 | -3.2 |
| Q | ANDREW CORP | 18 | 11 | 14.75 | 0.4 | 2.6 |
| Q | ARTEL COMM CORP | 3 | 2 | 1.75 | -0.1 | -6.7 |
| N | AT&T | 36 | 20 | 26.38 | -0.3 | -0.9 |
| Q | AVANT GARDE COMP INC | 6 | 2 | 2.25 | 0.3 | 12.5 |
| Q | AVANTEK INC | 17 | 6 | 7.00 | 0.0 | 0.0 |
| N | AYOIN CORP | 35 | 16 | 20.75 | -0.6 | -2.9 |
| N | 8ELL ATLANTIC CORP | 80 | 61 | 66.50 | -0.6 | -0.9 |
| N | BELLSOUTH CORP | 44 | 29 | 38.63 | -0.9 | -2.2 |
| Q | COMPRESSION LA8S INC | 6 | 2 | 4.13 | 1.0 | 32.0 |
| O | COMPUTER NETWORK TECH | 6 | 1 | 1.31 | 0.0 | 2.4 |
| O | CONTEL CORP | 40 | 25 | 33.38 | 0.0 | 0.0 |
| Q | OATA SWITCH CORP | 10 | 4 | 7.75 | -0.1 | -1.6 |
| Q | OIGITAL COMM ASSOC | 49 | 20 | 33.63 | 0.8 | 2.3 |
| Q | OYNATECH CORP | 33 | 14 | 22.25 | -0.5 | -2.2 |
| Q | FIBRONICS INTERNATIONAL INC | 8 | 2 | 4.25 | -0.1 | -2.9 |
| Q | GANOALF TECHNOLOGIES | 10 | 5 | 7.00 | -0.3 | -3.4 |
| Q | GENERAL OATACOMM INOS | 14 | 3 | 3.88 | -0.1 | -3.1 |
| N | GTE CORP | 45 | 29 | 35.75 | -0.1 | -0.3 |
| Q | INFOTRON SYS CORP | 12 | 5 | 11.25 | 0.0 | 0.0 |
| N | ITT CORP | 66 | 42 | 48.75 | 2.1 | 4.6 |
| N | M A COM INC | 16 | 7 | 9.13 | -1.0 | -9.9 |
| Q | MCI COMMUNICATIONS CORP | 15 | 6 | 14.50 | 0.9 | 6.4 |
| Q | MICOM SYS INC | 17 | 7 | 16.13 | -0.6 | -3.7 |
| Q | NETWORK SYS CORP | 13 | 7 | 10.00 | 0.1 | 1.3 |
| N | NORTHERN TELECOM LTO | 24 | 14 | 18.00 | 0.1 | 0.7 |
| Q | NOVELL INC | 30 | 12 | 21.25 | 1.5 | 7.6 |
| N | NYNEX CORP | 78 | 58 | 62.75 | -1.8 | -2.7 |
| N | PACIFIC TELESIS GROUP | 34 | 23 | 27.88 | -1.0 | -3.5 |
| N | PARADYNE CORP | 9 | 4 | 4.38 | -0.1 | -2.8 |
| A | PENRIL CORP | 5 | 1 | 5.13 | 0.4 | 7.9 |
| N | PLESSEY PLC | 40 | 23 | 30.13 | 0.4 | 1.3 |
| N | SCIENTIFIC ATLANTA INC | 20 | 8 | 14.25 | -0.4 | -2.6 |
| N | SOUTHWESTERN 8ELL CORP | 46 | 22 | 34.75 | -1.0 | -2.8 |
| Q | 3 COM CORP | 26 | 12 | 19.75 | 0.1 | 0.6 |
| N | TIMEPLEX INC | 40 | 17 | 32.30 | 0.0 | 0.0 |
| Q | UNGERMANN BASS INC | 16 | 5 | 12.13 | 0.1 | 1.0 |
| N | U S WEST INC | 60 | 43 | 52.25 | -1.1 | -2.1 |
| | **Computer Systems** | | | | | |
| Q | ALLIANT COMPUTER SYS | 36 | 5 | 6.25 | -0.8 | -10.7 |
| Q | ALPHA MICROSYSTEMS | 6 | 3 | 6.13 | 0.4 | 6.5 |
| Q | ALTOS COMPUTER SYS | 15 | 9 | 9.38 | -0.1 | -1.3 |
| A | AMDAHL CORP | 50 | 19 | 42.25 | 2.5 | 6.3 |
| Q | APOLLO COMPUTER INC | 25 | 9 | 15.63 | 0.6 | 4.2 |
| Q | APPLE COMPUTER INC | 60 | 28 | 42.00 | 0.3 | 0.6 |
| N | BOLT BERANEK & NEWMAN | 25 | 12 | 16.50 | -1.0 | -5.7 |
| Q | BRITTON LEE INC | 5 | 1 | 2.13 | 0.0 | 0.0 |
| N | COMPAQ COMPUTER CORP | 79 | 34 | 53.75 | 0.9 | 1.7 |
| Q | COMPUTER AUTOMATION INC | 17 | 6 | 9.88 | -0.9 | -8.1 |
| A | COMPUTER CONSOLES INC | 11 | 2 | 7.50 | 0.5 | 7.1 |
| Q | CONCURRENT COMP CORP | 24 | 11 | 18.50 | 1.5 | 8.8 |
| N | CONTROL DATA CORP OEL | 38 | 18 | 27.25 | 2.5 | 10.1 |
| Q | CONVERGENT TECH | 9 | 3 | 3.69 | 0.5 | 15.7 |
| Q | CONVEX COMPUTER CORP | 20 | 6 | 8.38 | -0.1 | -1.5 |
| N | CRAY RESH INC | 122 | 47 | 86.38 | -0.1 | -0.1 |
| Q | DAISY SYS CORP | 10 | 5 | 9.00 | -0.3 | -2.7 |
| N | DATA GEN CORP | 37 | 16 | 22.25 | -1.0 | -4.3 |
| N | DATAPOINT CORP | 9 | 3 | 5.25 | -0.1 | -2.3 |
| N | DIGITAL EQUIP CORP | 200 | 99 | 107.13 | 0.4 | 0.4 |
| N | FLOATING POINT SYS INC | 12 | 3 | 4.00 | -0.1 | -3.0 |
| N | GOULO INC | 34 | 8 | 13.50 | 2.4 | 21.3 |
| N | HARRIS CORP | 43 | 22 | 29.25 | -0.8 | -2.5 |
| N | HEWLETT PACKARO CO | 74 | 36 | 61.75 | -0.9 | -1.4 |
| N | HONEYWELL INC | 91 | 49 | 69.75 | -1.1 | -1.6 |
| N | I8M | 176 | 102 | 113.25 | -0.8 | -0.7 |
| Q | INFORMATION INTL INC | 15 | 9 | 13.00 | 0.4 | 3.0 |
| Q | IPL SYS INC | 3 | 1 | 1.63 | -0.4 | -18.8 |
| Q | MASS COMPUTER CORP | 14 | 4 | 4.50 | -0.5 | -10.0 |
| N | MATSUSHITA ELEC INOL LTO | 228 | 103 | 223.13 | 2.1 | 1.0 |
| Q | MEGADATA CORP | 6 | 3 | 3.13 | 0.0 | 0.0 |
| Q | MENTOR GRAPHICS CORP | 39 | 14 | 32.00 | 1.3 | 4.1 |
| N | N8I INC | 14 | 4 | 4.00 | -1.1 | -22.0 |
| N | NCR CORP | 87 | 50 | 61.25 | -1.1 | -1.8 |
| N | PRIME COMPUTER INC | 31 | 12 | 17.00 | -0.4 | -2.2 |
| Q | PYRAMID TECHNOLOGY | 14 | 5 | 13.75 | 0.5 | 3.8 |
| Q | STRATUS COMPUTER | 41 | 15 | 28.50 | 0.5 | 1.8 |
| Q | SUN MICROSYSTEM INC | 46 | 14 | 35.25 | -1.0 | -2.8 |
| Q | SYM8OLICS INC | 5 | 1 | 1.75 | 0.0 | 0.0 |
| N | TANDEM COMPUTERS INC | 37 | 16 | 18.63 | -0.3 | -1.3 |
| N | TANDY CORP | 57 | 28 | 44.25 | -1.5 | -3.3 |
| N | ULTIMATE CORP | 37 | 12 | 14.38 | 1.5 | 11.7 |
| N | UNISYS CORP | 48 | 24 | 34.75 | 0.3 | 0.7 |
| A | WANG LABS INC | 19 | 10 | 11.00 | -0.4 | -3.3 |
| | **Software & DP Services** | | | | | |
| Q | ADVANCEO COMP TECH | 6 | 1 | 1.25 | -0.3 | -16.7 |
| N | AGS COMPUTERS INC | 30 | 11 | 18.00 | 1.0 | 5.9 |
| Q | AMERICAN MGMT SYS INC | 20 | 9 | 15.38 | -0.4 | -2.4 |
| Q | AMERICAN SOFTWARE INC | 19 | 6 | 13.88 | 0.5 | 3.7 |
| N | ANACOMP INC | 11 | 4 | 10.00 | 0.4 | 3.9 |
| Q | ANALYSTS INTL CORP | 10 | 4 | 8.25 | 0.3 | 3.1 |
| Q | ASHTON TATE | 33 | 13 | 26.50 | -1.3 | -4.5 |
| Q | ASK COMPUTER SYS INC | 16 | 6 | 14.38 | 0.4 | 2.7 |
| Q | AUTOOESK INC | 34 | 12 | 29.75 | 0.5 | 1.7 |
| N | AUTO DATA PROCESSING | 55 | 16 | 40.38 | -0.5 | -1.2 |
| Q | BOOLE & 8ABBAGE INC | 12 | 5 | 8.75 | 1.0 | 12.9 |
| N | COMPUTER ASSOC INTL INC | 37 | 15 | 26.50 | -0.6 | -2.3 |
| Q | COMPUTER HORIZONS CORP | 15 | 7 | 11.38 | 0.5 | 4.6 |
| N | COMPUTER SCIENCES CORP | 73 | 42 | 42.88 | -0.9 | -2.0 |
| N | COMPUTER TASK GROUP INC | 17 | 9 | 11.50 | 0.0 | 0.0 |
| Q | COGNOS INC. | 17 | 4 | 7.00 | -0.1 | -1.8 |
| Q | COMSHARE INC | 28 | 12 | 16.75 | 0.0 | 0.0 |
| N | CULLINET SOFTWARE INC | 14 | 4 | 7.88 | 0.0 | 0.0 |
| Q | DUQUESNE SYS INC | 29 | 10 | 21.00 | 1.0 | 5.0 |
| A | OATA ARCHITECTS INC | 16 | 7 | 13.75 | 0.0 | 0.0 |
| N | GENERAL MTRS (CLS E) | 51 | 30 | 44.25 | 1.3 | 2.9 |
| Q | HOGAN SYS INC | 17 | 4 | 4.50 | 0.3 | 5.9 |
| Q | INFORMIX CORP | 31 | 12 | 21.00 | 0.0 | 0.0 |
| Q | INTELLICORP INC | 11 | 2 | 2.88 | -0.1 | -4.2 |
| Q | KEANE INC | 16 | 6 | 13.00 | 2.5 | 23.8 |
| Q | LOTUS OEV CORP | 40 | 19 | 22.75 | 0.0 | 0.0 |
| Q | MANAGEMENT SCI AMER | 15 | 6 | 8.38 | 0.3 | 3.1 |
| Q | MICRO PRO INTL CORP | 8 | 3 | 3.19 | 0.3 | 10.9 |
| Q | MICROSOFT CORP | 79 | 37 | 57.13 | 1.6 | 2.9 |
| Q | MORINO ASSOCIATES INC | 24 | 7 | 18 | 1.5 | 9.4 |
| Q | NATIONAL OATA CORP | 34 | 20 | 25.00 | -3.1 | -11.1 |
| Q | ON LINE SOFTWARE INTL INC | 22 | 9 | 9.50 | -0.4 | -3.8 |
| Q | ORACLE SYS CORP | 19 | 8 | 17.50 | 1.8 | 11.1 |
| N | PANSOPHIC SYS INC | 28 | 11 | 16.13 | -0.4 | -2.3 |
| Q | POLICY MGMT SYS CORP | 30 | 15 | 24.75 | 0.6 | 2.6 |
| Q | PROGRAMMING & SYS INC | 14 | 7 | 11.38 | -0.9 | -7.1 |
| Q | REYNOLDS & REYNOLDS CO | 38 | 14 | 17.50 | -0.1 | -0.7 |
| Q | SEI CORP | 19 | 10 | 17.25 | -0.8 | -4.2 |
| Q | SHAREO MED SYS CORP | 31 | 19 | 23.25 | -0.4 | -1.6 |
| Q | SOFTWARE PUBG CORP | 17 | 5 | 16.25 | 0.9 | 5.7 |
| A | STERLING SOFTWARE INC | 12 | 6 | 9.13 | 0.1 | 1.4 |
| Q | SUNGARO DATA SYS INC | 21 | 10 | 17.50 | -0.3 | -1.4 |
| Q | SYSTEMATICS INC | 32 | 19 | 31.00 | 0.3 | 0.8 |
| N | SYS. SOFT INC. | 24 | 7 | 15 | 0.8 | 5.2 |
| Q | VM SOFTWARE INC | 37 | 7 | 14.00 | 0.5 | 3.7 |
| | **Semiconductors** | | | | | |
| N | AOV MICRO OEVICES INC | 25 | 8 | 14.50 | 0.3 | 1.8 |
| N | ANALOG 0EVICES INC | 24 | 8 | 14.00 | 0.0 | 0.0 |
| Q | ANALOGIC CORP | 13 | 5 | 7.13 | -0.1 | -1.7 |
| Q | INTEL CORP | 42 | 18 | 32.25 | 0.0 | 0.0 |
| Q | LSI LOGIC CORP | 16 | 7 | 11.75 | 1.9 | 19.0 |
| N | MOTOROLA INC | 74 | 35 | 48.50 | -0.6 | -1.3 |
| N | NATL SEMICONOUCTOR | 22 | 10 | 13.00 | -0.5 | -3.7 |
| N | TEXAS INSTRS INC | 80 | 36 | 48.50 | 0.0 | 0.0 |
| A | WESTERN OIGITAL CORP | 33 | 11 | 16.00 | 0.5 | 3.2 |
| | **Peripherals** | | | | | |
| Q | ALLOY COMP. | 13 | 3 | 4.25 | 0.1 | 3.0 |
| N | AM INTL INC | 9 | 3 | 3.88 | 0.3 | 6.9 |
| Q | AST RESH INC | 21 | 6 | 14.88 | -0.1 | -0.8 |
| Q | AUTO TROL TECH CORP | 9 | 3 | 5.00 | 0.3 | 5.3 |
| Q | 8ANCTEC INC | 16 | 5 | 8.38 | 0.1 | 1.5 |
| Q | CIPHER DATA PROOS INC | 14 | 4 | 9.25 | 0.0 | 0.0 |
| A | COGNITRONICS CORP | 5 | 2 | 3.63 | -0.3 | -6.5 |
| N | COMPUGRAPHIC CORP | 28 | 19 | 26.25 | 0.3 | 1.0 |
| A | OATAPROOUCTS CORP | 24 | 7 | 9.13 | -0.9 | -8.8 |
| A | OATARAM CORP | 8 | 5 | 7.63 | -0.1 | -1.6 |
| N | EASTMAN KODAK CO | 71 | 39 | 41.88 | 0.9 | 2.1 |
| Q | E M C CORP MASS | 29 | 7 | 7.50 | 0.0 | 0.0 |
| Q | EMULEX CORP | 9 | 4 | 8.00 | 0.0 | 0.0 |
| Q | EVANS & SUTHERLANO | 35 | 17 | 17.88 | 0.1 | 0.7 |
| Q | ICOT CORP | 8 | 3 | 3.50 | 0.2 | 5.6 |
| Q | INTERLEAF INC | 24 | 11 | 16.00 | -1.4 | -7.9 |
| Q | IOMEGA CORP | 5 | 1 | 3.13 | -0.3 | -7.4 |
| Q | LEE OATA CORP | 8 | 3 | 3.50 | -0.3 | -6.7 |
| Q | MASSTOR SYS CORP | 6 | 1 | 3.19 | 0.1 | 2.0 |
| Q | MAXTOR CORP | 33 | 6 | 13.75 | -1.8 | -11.3 |
| Q | MICROPOLIS CORP | 44 | 13 | 22.75 | -2.3 | -9.0 |
| Q | MINISCRIBE CORP | 18 | 5 | 11.00 | -1.0 | -8.3 |
| N | MINNESOTA MNG & MFG CO | 84 | 45 | 58.88 | -1.3 | -2.1 |
| A | MSI DATA CORP | 19 | 8 | 16.75 | 0.5 | 3.1 |
| Q | PERSONAL COMPUTER PROOUCTS INC. | 7 | 4 | 6.00 | -0.1 | -2.0 |
| Q | PRIAM CORP | 6 | 1 | 2.00 | -0.1 | -5.9 |
| Q | PRINTRONIX INC | 13 | 7 | 9.50 | 0.9 | 10.1 |
| N | QMS INC | 27 | 8 | 10.88 | -0.1 | -1.1 |
| Q | QUANTUM CORP | 26 | 8 | 10.63 | -0.4 | -3.4 |
| Q | RAMTEK CORP | 6 | 1 | 1.63 | 0.4 | 30.0 |
| N | RECOGNITION EQUIP INC | 22 | 7 | 8.50 | -0.6 | -6.8 |
| Q | REXON INC | 14 | 5 | 8.94 | 0.4 | 5.2 |
| Q | SCAN TRON CORP | 17 | 7 | 15.50 | -0.9 | -5.3 |
| Q | SEAGATE TECHNOLOGY | 46 | 10 | 17.88 | -2.6 | -12.8 |
| N | STORAGE TECH CORP | 5 | 1 | 1.88 | 0.1 | 7.1 |
| Q | TANOON CORP | 7 | 1 | 2.63 | 0.0 | 0.0 |
| A | TEC INC | 7 | 3 | 4.75 | 0.0 | 0.0 |
| N | TEKTRONIX INC | 41 | 21 | 24.88 | 0.3 | 1.0 |
| Q | TELEVIDEO SYS INC | 3 | 1 | 1.44 | 0.1 | 9.5 |
| N | TELEX CORP | 81 | 30 | 47.50 | -0.8 | -1.6 |
| Q | WYSE TECH | 40 | 11 | 19.63 | -0.4 | -1.9 |
| N | XEROX CORP | 85 | 50 | 54.38 | 0.3 | 0.5 |
| Q | XIOEX CORP | 16 | 6 | 6.00 | -0.3 | -4.0 |
| | **Leasing Companies** | | | | | |
| Q | CAPITAL ASSOCIATES INTERNATIONAL INC | 11 | 4 | 4.63 | 0.1 | 2.8 |
| N | COMOISCO INC | 37 | 12 | 21.13 | -0.3 | -1.2 |
| N | CONTINENTAL INFO SYS | 14 | 5 | 7.50 | -0.1 | -1.6 |
| Q | PHOENIX AMERN INC | 6 | 2 | 3.06 | 0.1 | 2.1 |
| Q | SELECTERM INC | 6 | 3 | 4.25 | 0.0 | 0.0 |

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# May flowers

## *Amdahl blossoms; CDC's buds open amid Belzberg report*

Spring arrived on Wall Street last week as several leading computer issues bloomed amid a generally stormy and down market. Leading the gainers as of Thursday's close was Amdahl Corp., which rose 3¼ points from a week earlier to 42⅞ on news that it will unveil a series of high-speed mainframes. Control Data Corp. also scored big in the four days of trading; its stock rose 2½ points to 26⅝ after reports circulated that the Belzberg family of Canada has a stake in the disk-drive maker and could be considering a take-over bid.

Other top gainers included Microsoft Corp., up 2½ points to 57; Compaq Computer Corp., up 2¼ points to 53¾; Cray Research, Inc., up 2 points to 86; Computer Associates International, Inc., up 1⅛ points to 26¾; Digital Equipment Corp., up ⅞ of a point to 105¾; Apollo Computer, Inc., up ⅞ of a point to 15½; and Apple Computer, Inc., up ¾ of a point to 41¾ amid increased analyst revenue expectations. The few industry stocks that fell included IBM, which lost the momentum it had been gaining in the past few weeks and slid 2⅛ points to 111¼, and Ashton-Tate Corp., off 1½ points to 25¾.

JAMES DALY

# CDC users overlook takeover threat

BY JEAN S. BOZMAN
CW STAFF

IRVINE, Calif. — As stories of a possible takeover of Control Data Corp. by the Canadian Belzberg family swirled about the firm's Minneapolis headquarters last week, CDC's largest customers — who attended the 48th meeting of the VIM users group here — did not flinch. The Belzbergs, who also tried to take over Ashland Oil, Inc., had amassed about 5% of all CDC shares just in time for the firm's annual meeting Wednesday.

Even as CDC Chairman Robert Price said at the annual meeting, some 2,000 miles away, that his firm "will fight to remain independent," the talk here was of software migrations and product enhancements. The 500 attendees at the VIM meeting were more interested in migrating from CDC's older NOS operating system to NOS/VE.

"We're happy with what we have," said one MIS manager from TRW, Inc., which owns some CDC Cyber 850 and 860 machines that have been running NOS for years.

Even users concerned about CDC's future take a pragmatic approach to CDC's troubles. "We have CDC, Digital Equipment Corp., Cray and IBM," said one manager from an oil company. "If CDC were to go away, we'd still have the other three."

### Not fickle

"Most users are incredibly loyal," said Michael L. Dech, director of Tactical Marketing at CDC's Computer Systems Division. "Our challenge now is to reach out to new users for our Cyber 900 series," something that is working well in Europe, South America and Asia, he said.

Last week, though, the focus was on VIM's users, who represent 80% of the CDC mainframe user base in North America. VIM's 300-plus user sites include national research laboratories, universities, utility companies and Fortune 500 engineering divisions.

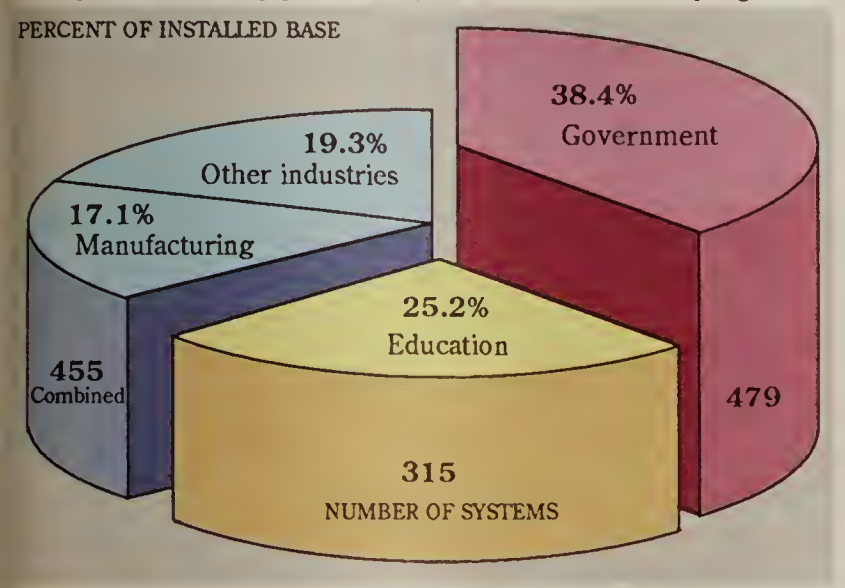
For the last several years, CDC's mainframe user base has been stable, according to newly elected VIM President Abraham S. Levine, manager of Scientific Computing Center Software Systems at Rockwell International Corp. Utility users are a good example of the trend.

But now, even utility users are feeling pressure to upgrade to the new generation of Cyber 990s, just as Levine's Rockwell MIS group did in late 1986. "The thinking at that time was that if CDC's financial troubles were going to overwhelm it, then we might as well have the latest product," Levine said. "That way, we knew we would get supported on the system, no matter what happened."

VIM's new officers said they are confident that CDC's new management, including emigres from IBM's 3090 mainframe research labs, will be able to grow the customer base and sustain a viable product strategy.

### Evenly divided loyalties

*CDC's base of Cyber mainframes as of September 1987 indicates a rough parity among government, education and industry segments*




INFORMATION PROVIDED BY CONTROL DATA CORP.
CW CHART

## Cyber line to reach out

Control Data Corp. previewed a number of additions to its Cyber 930, 960 and 990 mainframe and ETA-10 supercomputer product lines at the VIM users group meeting last week. Among the additions were the following:

- A software tool kit intended to let users of Digital Equipment Corp. VAX systems migrate to Cybers. The NOS/VE Migration Toolkit, priced from $21,500 to $52,500, not including a $3,500 license fee, automatically converts DEC VAX/VMS Fortran programs to NOS/VE Fortran. It also identifies code that cannot be translated to NOS/VE statements. The tool kit supports CDC's interface for Apple Computer, Inc.'s Macintosh.
- The expected porting of the X Window environment to NOS/VE. The addition of X Window to CDC's workstations would open them to dozens of off-the-shelf applications supporting the X Window standard. Introduction is planned for the fourth quarter of this year or the first quarter of 1989, when CDC reportedly will announce Release 1.4.1 of NOS/VE.
- The porting of AT&T's Unix System V to the ETA-10 line of supercomputers. This move, slated for announcement in September, would bring Unix support to the entire range of CDC mainframes and workstations, according to Thomas W. Jones Jr., marketing manager at CDC's ETA Systems, Inc. subsidiary.

JEAN S. BOZMAN

# Skewing

FROM PAGE 1

of strategic marketing, acknowledged that the 16 closely coupled Sequent Symmetry S81 processors with 80M bytes of memory yielded the best results: "We established our on-line transaction processing credentials in a big way. More than 100 transactions per second was a breakthrough."

Relational has no results yet for customers wondering what transaction rate they might expect on their VAXs.

Sybase, a vendor that did turn to the popular DEC mid-range machine, actually used two VAXs to conduct its benchmark. Sybase simulated TP-1 transactions with a program running on a VAX 8800, leaving a VAX 8700 free to run only the data base management system.

Marq N. Elliott, director of development for IDMS/SQL, said Cullinet ran both IDMS/SQL and the transaction generator program on a VAX 8550. "We felt it was important to run them on the same machine, more like what our customers are doing," Elliott said.

### Benchmark history

Sybase, Relational and Cullinet all based their tests on a transaction established by Tandem Computers, Inc., which published a benchmark of VLX Nonstop SQL a year ago. Widely hailed for its accuracy, the Tandem benchmark refined the only industry standard at the time, a debit/credit benchmark described in an April 1985 *Datamation* article.

As a hardware manufacturer, Tandem wanted to measure an entire system, deriving a hardware-plus-software cost per transaction. Its benchmark was the source of the ET-1 transaction.

Mid-range DBMS vendors were interested only in measuring the performance of their software, so they created a spin-off of the Tandem benchmark, the TP-1 transaction. This was separated from the TP monitor and other subsystem costs foreign to the minicomputer world, Relational's Zornes said.

### Weighing in

A key element used by Tandem was scaling — an in-scale reflection of conditions the software would encounter if pressed into service in the real world. For that reason, each transaction per second was supposed to be based on a data base of 100,000 customer accounts.

Cullinet and Relational said they honored that requirement and ran their TP-1 transactions against data bases of one million and 10 million account records, respectively.

Sybase officials said they benchmarked at both 100,000 and one million account records, but their documentation indicates that the VAX 8700 was tested with only the 100,000 accounts. The smaller number would allow a much greater percentage of records to be held in main memory, reducing I/Os.

When Sybase tested one million records on the DEC Microvax II, throughput was off about 5%. "The more records you use, the slower you'll run," acknowledged Berl Hartman, director of product marketing at Sybase.

"When we loaded 100,000 records into memory, it was bam, bam, bam — we did 500 transactions per second," Zornes said.

Sybase's documentation also indicates that its sustainable transaction rate was lower than the peak 29.3 reported. The steady-state rate was closer to 28 transaction/sec.

Another element of the Tandem benchmark was mirror journaling, or creating two images of the transaction in hardware devices to provide full recovery capability. The mid-range software vendors prefer to drop this standard as well because of its heavy I/O requirement.

When Relational imposed mirror journaling on its benchmark, transaction throughput dropped from 104 to 91. The Tandem Nonstop SQL system processed 208 transaction/sec. with mirror journaling.

Oracle Corp., which is notoriously shy about benchmarking, has yet to make public a TP-1 benchmark. But that did not stop it from casting stones at Sybase.

The Sybase benchmark was conducted using its proprietary Transact SQL, which is not ANSI SQL compatible and "locks you into Sybase forever," said Oracle Chairman Larry Ellison in an April letter to his sales force. Hartman said Sybase's SQL is ANSI-standard compatible in its individual statements.

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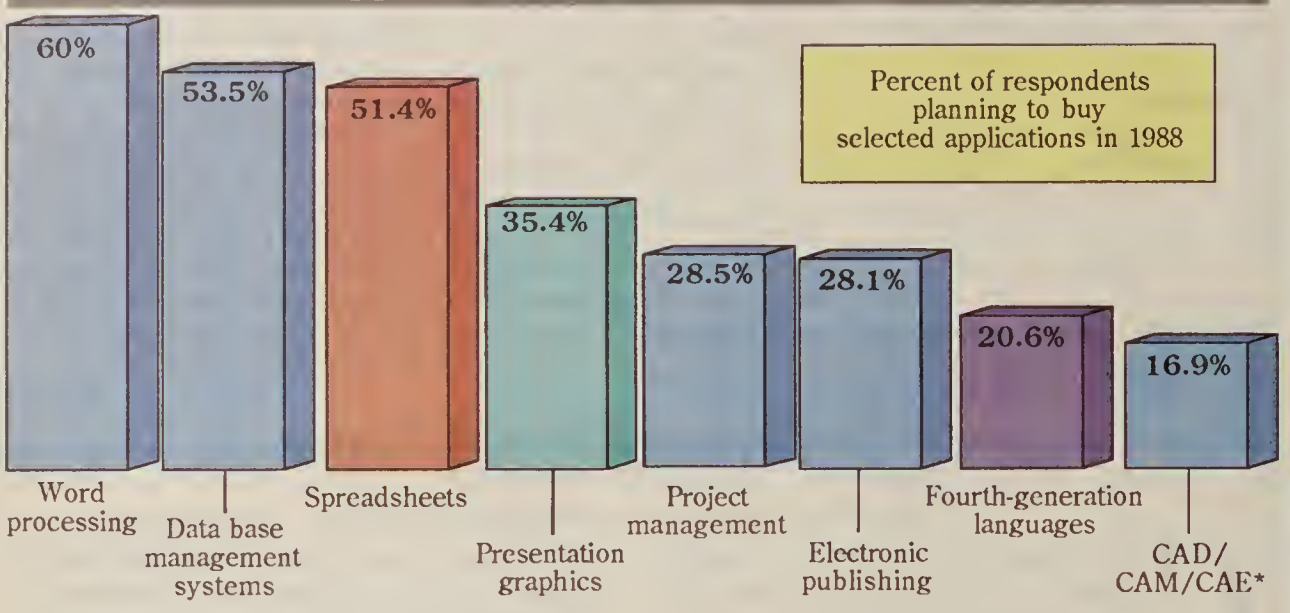
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# TRENDS

# Software applications

## Traditional PC applications still top software buying intentions




* Computer-aided design, manufacturing and engineering

When it comes to running today's newest software programs, many MIS managers are embracing personal computers and all but turning their backs on mainframes and departmental systems.

According to figures compiled by The Sierra Group, a Tempe, Ariz., research firm, an overwhelming majority of the software applications purchased this year will have been designed to operate on PCs.

The Sierra Group polled 1,588 users from such vertical markets as finance, insurance, manufacturing and education. Seventy percent of the respondents were MIS managers.

Applications showing the most lopsided PC favoritism included word processing, electronic publishing, project management and graphics presentation software. Of the MIS sites planning to purchase spreadsheets this year, 88% will implement them on PCs, only 19% will have any on departmental systems and just 7% will run them on mainframes.

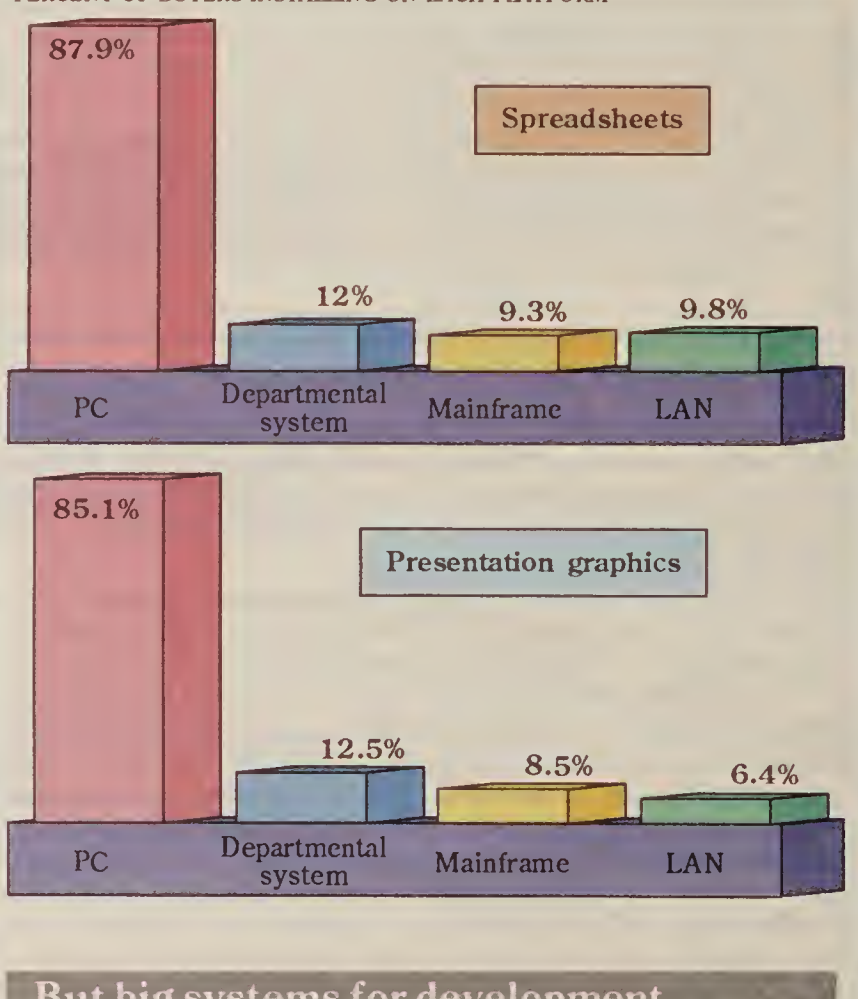
The contrast is even sharper for applications that seem designed more for a PC than a large system. The poll showed that 85% of the sites plan to use graphics presentation software on PCs, while only 13% plan departmental system installations, and only 9% will be plugged into mainframes.

But this does not mean that non-PC hardware is out for the count. Mainframes and departmental systems will be used at least as much as micros for fourth-generation languages, electronic mail and accounting packages.

STEPHEN JONES

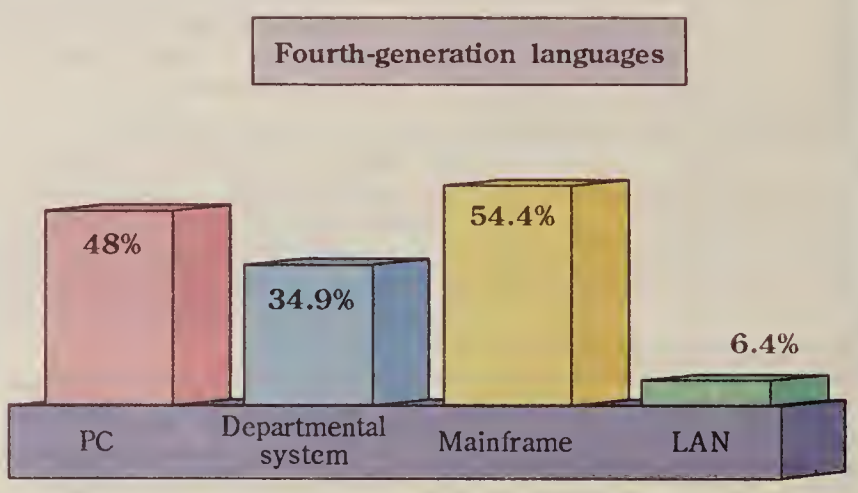
## PCs preferred for spreadsheets, graphics

PERCENT OF BUYERS INSTALLING ON EACH PLATFORM




## But big systems for development

PERCENT OF BUYERS INSTALLING ON EACH PLATFORM




INFORMATION PROVIDED BY THE SIERRA GROUP
CW CHARTS

# INSIDE LINES

**Software arts.** A preliminary agreement by Tulsa, Okla., software developer MPSI Systems to purchase decision support systems vendor Execucom Systems (see story page 101) has revealed assets that extend beyond the usual hodgepodge of facilities, equipment and installed base. Execucom, based in Austin, Texas, has a collection of Southwest American Indian artifacts purchased by Jerry Wagner, the firm's founder, that is said to be valued at roughly a quarter of a million dollars. The prospective owners are unsure about whether they would keep the collection if the acquisition were concluded.

**Now you store it; now you don't.** Erasable optical storage — actually, the vendors would now like us to refer to it as "rewritable" — takes one more step toward affordability this week when San Jose, Calif.-based Maxtor Corp. unveils new products. Sources say erasable disk drives will be made commercially available at about half the common sample price of $10,000.

**Looking for a few good clone-busters.** With its big help-wanted ad in *The Wall Street Journal* last week, it's apparent that IBM wants to hire a slew of patent attorneys for assignments in Burlington, Vt., Raleigh, N.C., Tucson, Ariz., Boca Raton, Fla., and Upstate New York. There's no mention about whether the legal troops will work on protecting the PS/2 patents, but the ad indicates the jobs involve signal processing, computer hardware and software, digital electronic circuits, semiconductors and communications.

**Announce and ship the same year? Wow!** Lotus is prepping The Application Connection 5.0 for release in the middle of this month. The micro-to-mainframe communications software has been rewritten in C, boasts greater performance and makes individual end users more self-sufficient through a new menu-based feature called The Selection. But do not expect to get the software all at once: It will ship in two sets, one in the third quarter with support for SQL/DS, and the complete system by year's end, a Lotus source said.

**Watch out, Manzi . . .** On *Washingtonian Magazine*'s list of the top salaries in the Washington, D.C., area, Richard L. Earnest, president and CEO of VM Software in nearby Reston, Va., garners 16th spot. His 1987 income was listed as $1,851,843 — not enough to bump Lotus's Jim Manzi off the top of *Business Week*'s recent list, but sufficient to place him in the same league as media celebrities Willard Scott, Ted Koppel and Bob Woodward — and well above Bell Atlantic's Thomas Bolger, at $1,267,202, and MCI's Bill McGowan, at $733,653. The magazine also revealed that columnist George Will, who earned $988,167, made a cool $276,000 in 1986 from stock investments in Microsoft, Autodesk, Computer Associates and Sun.

**A CASE in point.** IBM demonstrated what appeared to be the forerunner of its application development environment at the CASE Expo in Dallas last Thursday, with a repository as its core component. The system employed development software, currently in use in West Germany, emphasized methodology as much as tools and will cover the development life cycle, said Vaughan Merlyn, chairman of CASE Research. Third-party computer-aided software engineering tools, particularly front-end tools, can be integrated into the system.

**Zero-percent interest.** The hot line was ablaze last week with John Cullinane's vehement denial of a report here earlier that Computer Associates and Cullinet were in takeover talks. Not true, declared Cullinane: The company received only one feeler from Computer Associates and rejected it out of hand. That was one more contact than anybody else was willing to 'fess up to when the story was being pursued a week earlier.

*So take heed, industrial giants — when the phone rings, answer it! Better yet, take your message right to the people! Call the hot line at 800-343-6474 or 617-879-0700, and make sure News Editor Pete Bartolik gets the facts out.*

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